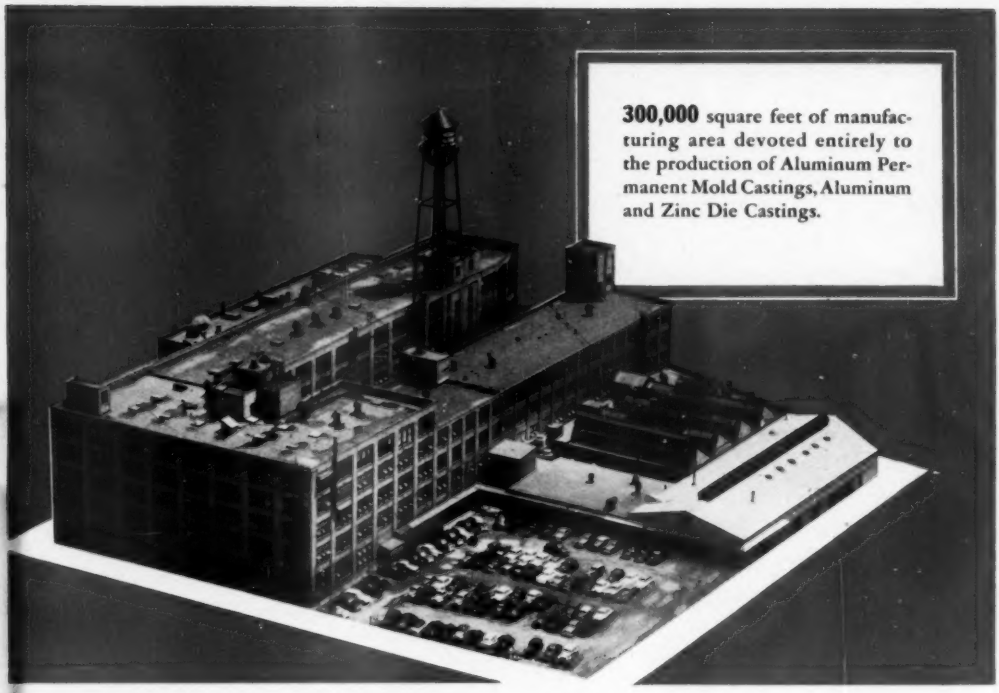
DIE CASTINGS

INCLUDING A SPECIAL FINISHING SECTION

THE PRODUCT DESIGN MAGAZINE FOR USERS AND POTENTIAL USERS OF DIE CASTINGS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APRIL 1951
Vol. 9 No .4

DIE CASTINGS

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COVER—THE PHOTOGRAPHIC EQUIPMENT industry is a large consumer of die casting production. Parts for an enlarger built by Elwood Pattern Works, Inc., are shown being removed from an oven which bakes the wrinkle finish. The interior of this part is lined with black flock to prevent glare. See articles beginning on page 21 (design of the enlarger) and page 37 (flock finishing).

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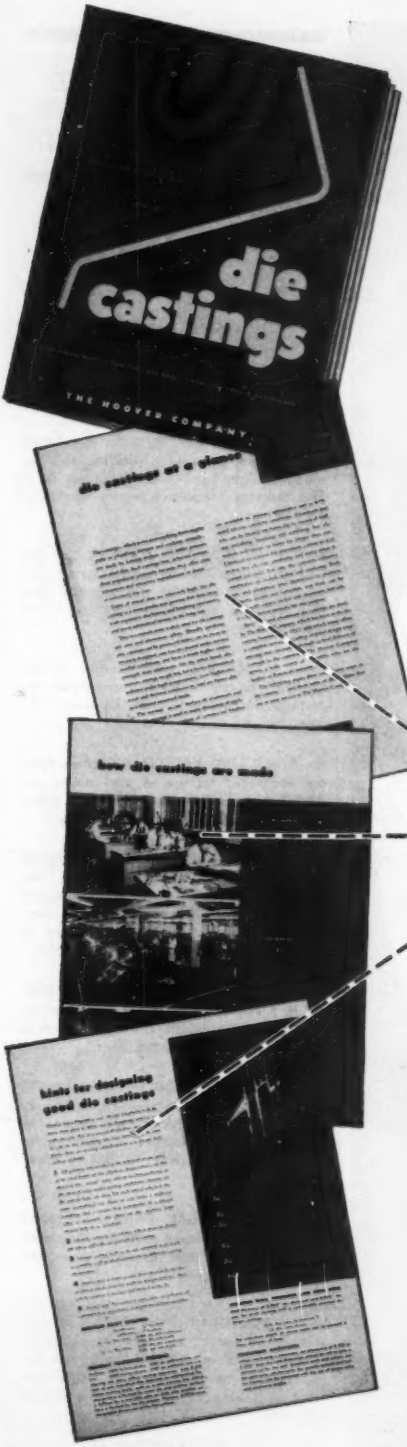
die castings
THE HOOVER COMPANY
die castings at a glance
how die castings are made
hints for designing good die castings

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LITERATURE AND SERVICES OFFERED IN THIS MONTH'S ADS

NOTE: Circle numbers on the enclosed postcard to indicate literature, samples or trial services you wish to receive.

No. 1. THE CERTIFIED ZINC ALLOY PLAN is the subject of a bulletin available from the American Die Casting Institute. The plan assures users of licensed companies' die castings of "on grade" zinc alloys.

No. 2. SAMPLES OF TINY DIE CASTINGS and bulletins covering production facilities are offered by the Gries Reproducer Corp. This company specializes in very small zinc die castings.

No. 3. A "HOW-TO" BOOKLET ON DIE CASTINGS is offered by the Hoover Co. The booklet shows uses for die castings, how they are made and gives suggestions on die casting design.

No. 4. LITERATURE AND DESIGN INFORMATION on aluminum and magnesium die castings are available from Litemetal Die-cast, Inc.

No. 5. MELTING KETTLES and allied foundry equipment for use in die casting are described and illustrated in C. H. Milles Foundry Co.'s Catalog No. 101.

No. 6. PYDRAUL F-9 HYDRAULIC FLUID is described in Technical Bulletin No. O-D-602, available from the Monsanto Chemical Co. F-9, a non-flammable compound, was developed primarily for use in die casting machines.

No. 7. A FOLDER DESCRIBING THE MONARCH Aluminum Mfg. Co.'s plant and its zinc and aluminum die casting facilities is available from the company.

No. 9. "HOW TO DIMENSION PRINTS FOR DIE CASTINGS" is the title of a booklet offered by the Newton New Haven Co. The booklet gives detailed instructions for guidance in dimensioning die casting drawings.

No. 10. CENTRIFUGAL DRIERS or plated work or small lacquered parts are illustrated in a four-page folder available from the New Holland Machine Co.

No. 11. BURNISHING MIXTURES and suggestions on how to use them are contained in a catalog issued by the Abbott Ball Co. The company manufactures burnishing shapes made of bearing ball steel in many shapes and sizes.

(Continued on Page 8)

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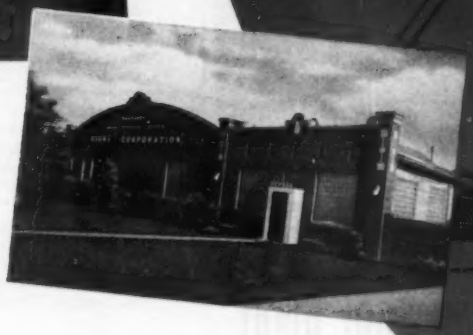

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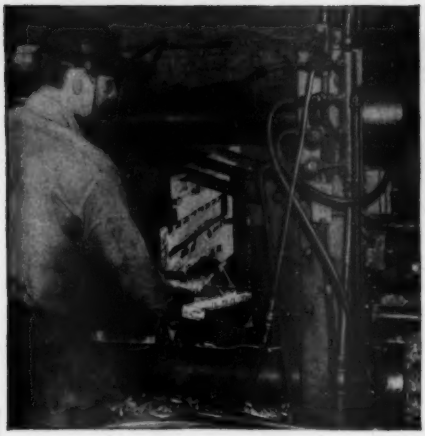

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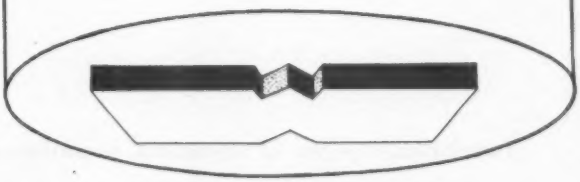

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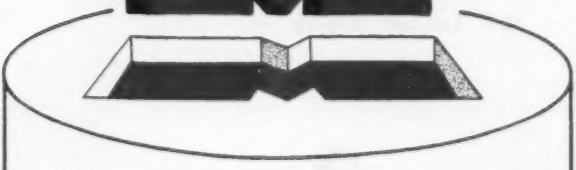

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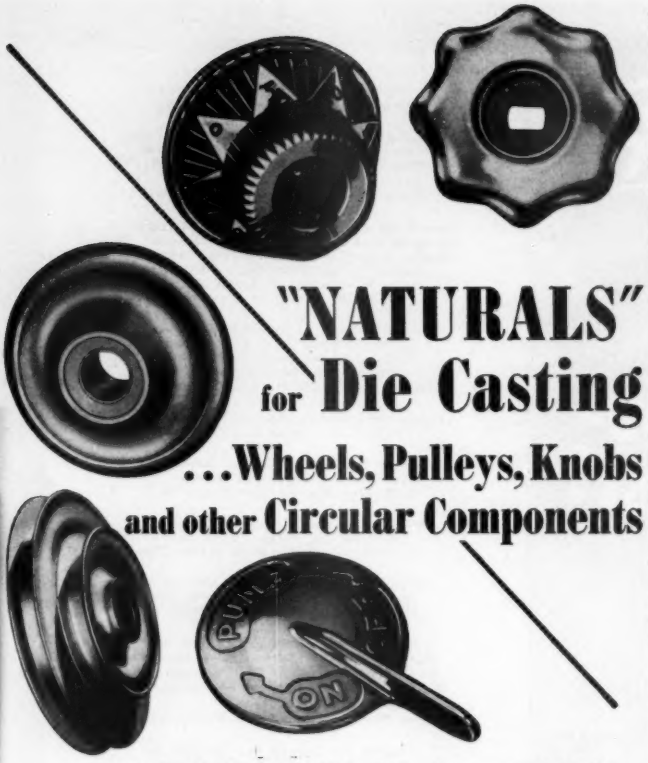

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Flywheels, handwheels, pulleys, discs, control knobs, circular dials and covers are typical of circular units often die cast in quantity with substantial savings to the user.

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MILWAUKEE DIE CASTING COMPANY

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LITERATURE AND SERVICES

(Continued from Page 4)

No. 12. ENAMEL FILLING of recesses in die cast parts is illustrated and described in literature available from the Acromark Co.

No. 13. A BRIGHT CHROMATE FINISH called Iridite is manufactured by Allied Research Products, Inc. Full information and free samples or processing are available.

No. 14. "ADVANCED BARREL FINISHING" is the title of a booklet offered by the Almco Division. The booklet gives details of the Supersheen method of controlled barrel deburring, grinding and finishing.

No. 15. BACKSTAND BELT GRINDING AND POLISHING and its advantages over other methods are discussed in a Coated Abrasives Div., Armour & Co., booklet. The booklet also shows equipment needed for backstand belt work.

No. 16. "CONTROLLED-AIR-POWER FEEDING" of parts to press rams can save time and money, according to the Bellows Co. Their bulletin T-80 and other available literature on rotary feed tables tell how it's done.

No. 17. DIE-FINISHING COMPOUNDS made by the Hyprez Div., Engis Equipment Co., are described in a company folder. Hyprez diamond compounds are sold in cartridges for use in the Hyprez applicator gun.

No. 18. CORROSION-RESISTANT AND PAINT-BONDING coatings made by the Neilson Chemical Co. for use on zinc, aluminum and steel are described in literature available from the company.

No. 19. "SOME GOOD THINGS TO KNOW ABOUT METAL CLEANING" is the title of a 44-page booklet offered by Oakite Products, Inc. The company manufactures a line of metal-cleaning materials.

No. 20. LAPPING MACHINES WHICH ELIMINATE the need for gasketing complex die cast shapes are described in a 16-page booklet offered by the Crane Packing Co.

No. 21. SIMULATED METAL FINISHES are given to products with Platelustre, a paint recently marketed by the Maas & Waldstein Co. Literature is available on this product, which can be used to simulate copper, brass or bronze plating.

No. 22. AN ELECTRO-CLEANER AND SURFACE CONDITIONER designed especially for use on zinc-base die castings is described in a Diversey Corp. bulletin. Diversey No. 505 is used for reverse-current electro-cleaning and surface conditioning.

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...if you want to cut corners, speed production, lower costs

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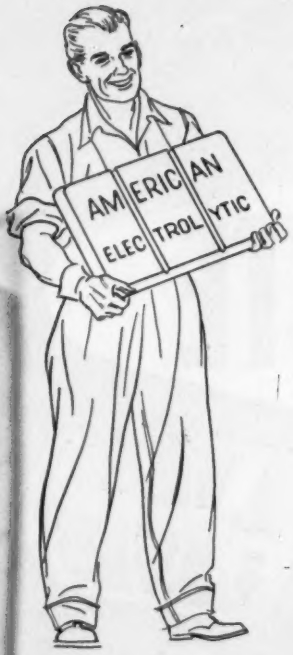

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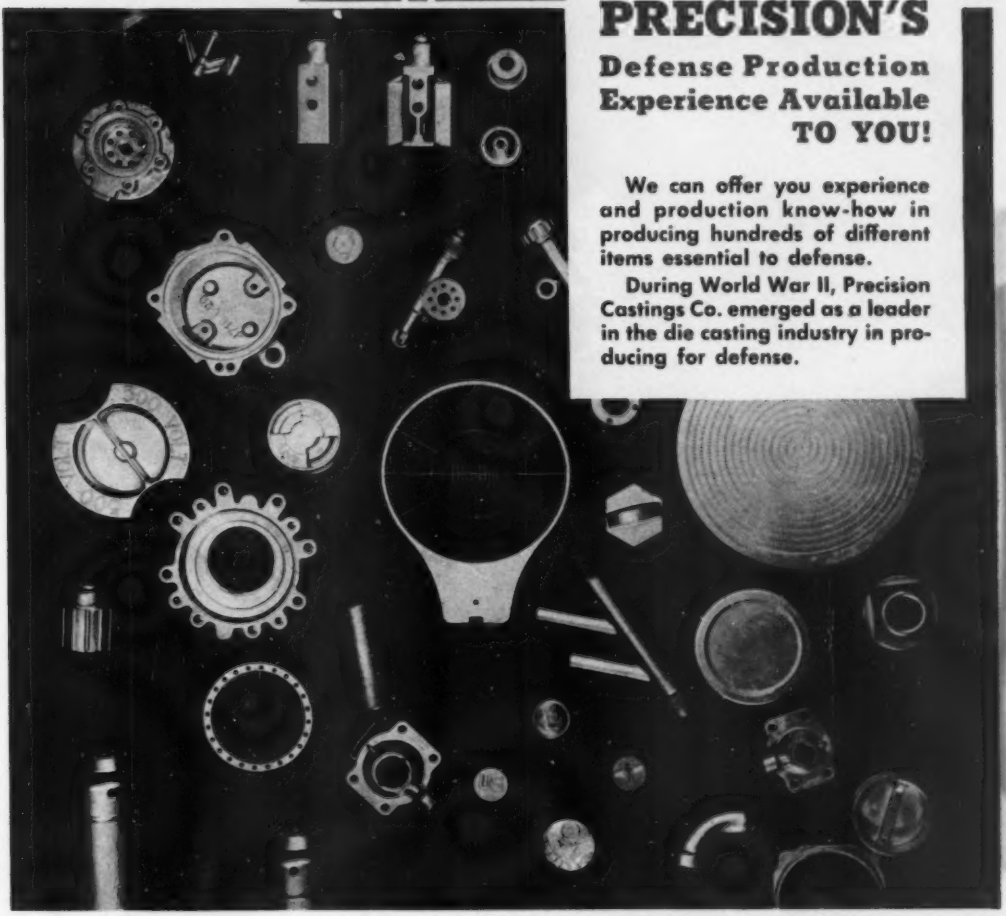

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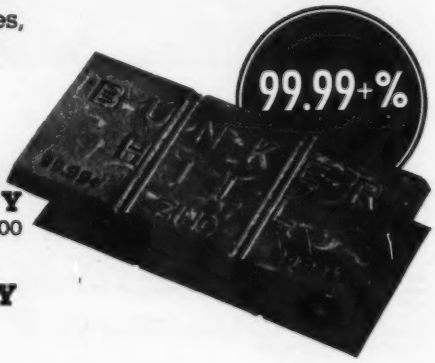

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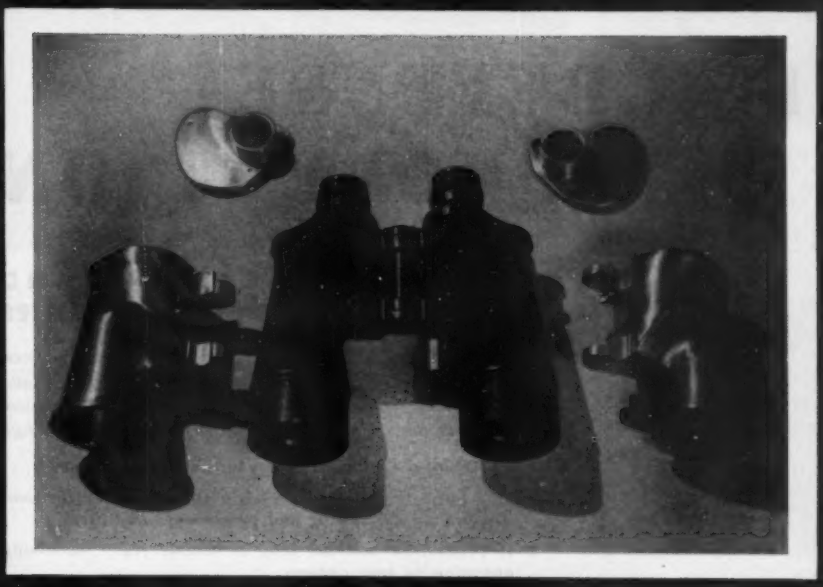
INTRICATE DESIGN IN DIE CASTING



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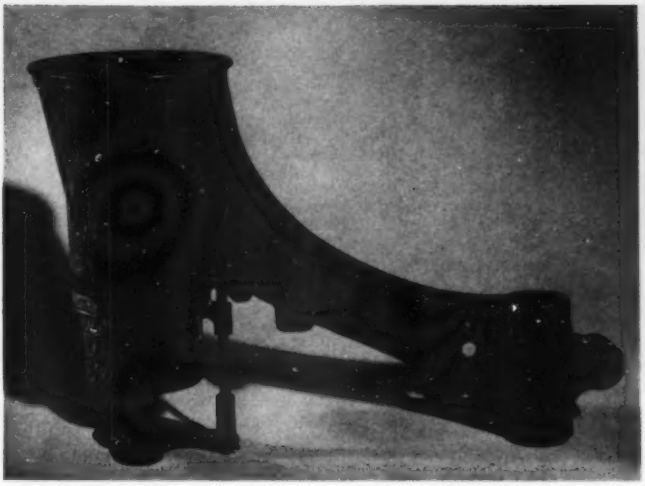


1. RIGID T-SECTION web provides rugged support for the main housing components in this important structural part of a photographic enlarger. Shown at *right* are two secondary operations being performed on this large zinc die casting.

2. SIMPLE MACHINING operations, such as the drilling for draft removal, *above*, are characteristic of the secondary operations at Elwood Pattern Works. Paint baking oven for the wrinkle finish is shown *below*.

STRUCTURAL RIGIDITY

with Die Cast Frames

THE AMATEUR photographer working painstakingly on enlargements in his dark room is likely to be manipulating a lot of die castings as he makes adjustments for the proper size. There will be no doubt about this if his equipment comes from Elwood Pattern Works, Inc., Indianapolis, which has been producing photographic enlargers for 25 years.

During about half of this time, zinc and aluminum die cast components have been replacing iron and aluminum sand castings in increasing measure. The model discussed in this report, designed for amateur use and taking negatives up to 2¼ by 2¼ inches, consists almost exclusively of die cast parts.

The change to die castings has doubled the company's finishing production as compared with the rate formerly possible with sand castings. The main reason

3. POLISHED aluminum surfaces on the outside, and black flock-coated inside give these lamp housing die castings attractive appearance and a non-reflective interior. Fit of the castings is held very close to avoid light leaks.

for the increase is the relatively small amount of machining and polishing required on the die castings.

Many jigs and fixtures have been eliminated. Holes that had to be drilled in the sand castings are cored in the die castings, requiring only tapping. Smooth surfaces and dimensional accuracy are obtained now with almost no secondary processing.

In the B-M model, a popular enlarger for small-size negatives, most parts are die cast. One exception is the flat, sand cast base plate where dimensional accuracy is not essential. The vertical adjustment arm inserted in the base is a length of chrome plated steel tubing.

Where shapes are more intricate or need smoother as-cast surfaces, die castings are proving their superiority and economy. Among these parts are the four main components of the instrument body, the three housing components which cover and shield the lamp and a few smaller fittings.

Both zinc and aluminum die castings are used depending upon the function of the parts in use and on production needs. Zinc is chosen for its workability in some places and aluminum where light weight is desirable.

Three Finishes Used

The combination of three types of finishes on the die cast parts provides the specific appearance or service characteristics desired. The main body, Figure 1, is finished on all exterior surfaces with a gray wrinkle enamel; three aluminum die castings which mount and house the lamp are polished and left unpainted because they are subjected to the heat of the lamp.

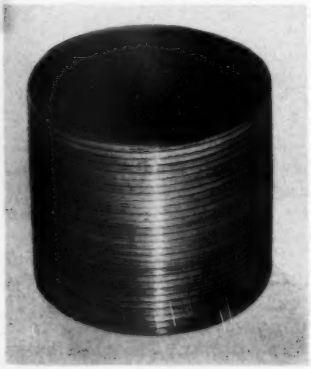
The third finish is a flock coating applied to the interior of the body and lamp housing components to eliminate reflections that would fault the photographic paper. The company holds a patent covering this application of flock to the interior of photographic enlargers.

In the flocking process, the surfaces to be coated are first sprayed with a black sizing type of adhesive and then the pulverized black cotton flock is sprayed onto the tacky surface with a special type of spray gun.

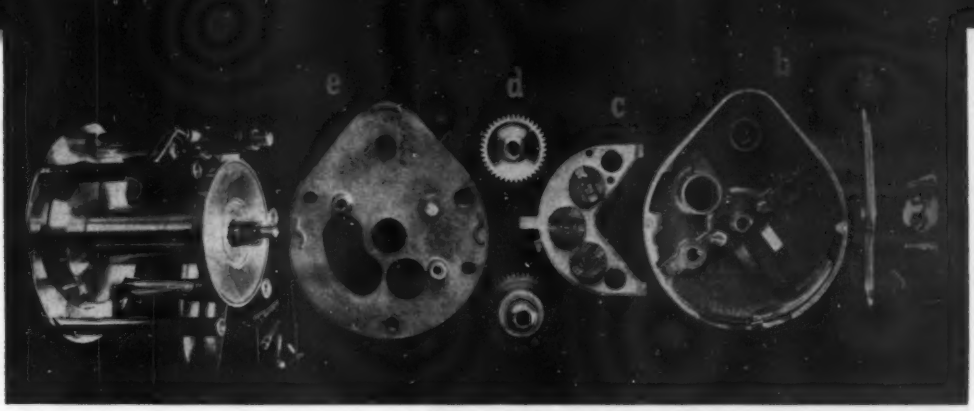
Rigid Structural Design

To hold the lamp and lens assembly perpendicular to the base plate and rigidly located on a center several inches from the vertical steel adjustment post, requires a carefully designed structural unit, such as the

(Continued on Page 60)



4. TRIPLE THREAD on this die cast adjusting barrel is cut using a geometric die on a drill press, whereas this type of threading would ordinarily be done with a turret lathe or drill press.



TO MOUNT and align the various elements of this magnetic type fishing reel, aluminum die castings provide bosses, irregular-shaped cored holes and accurate dimensions.

Die Cast Aluminum For Non-Magnetic Housing

NON-MAGNETIC components of complex assemblies can often be produced most economically by die casting them in aluminum. A special type of fishing reel which employs a magnetic field to control backlash is one example.

The Electromatic reel made by the Horton Bristol Manufacturing Company, Bristol, Conn., employs aluminum die castings for three of its major parts. Assembly of the reel is simplified by driving self-tapping screws directly into cored holes in these castings for some of the attachments. An unusual feature of this reel is its electrical brake to control backlash.

Many a weekend fisherman out for a few hours relaxation from a heavy work schedule knows the agony that backlash and the resulting line snarls can cause in bait casting. The "experts" brake their reels by thumb pressure but the novices need a better means of control. Braking in the Electromatic reel varies with the speed at which the reel is spinning. It is greatest when the speed of the spool is highest, decreasing as the bait settles down, and becoming zero when the spool stops. The effect is to keep the spool from spinning after the line begins to run out more slowly, but the braking action gradually diminishes and thus does not cut the cast short.

Three small Alnico permanent magnets are mounted inside of one end cap of the reel so that a copper disc attached to the end of the spool rotates in their magnetic field as the spool turns. Currents set up in this copper disc interact with the fields of these little magnets to produce a braking action on the spool. This braking action is adjustable for different casters.

The accompanying disassembled view shows the construction of the reel, the die cast parts, and the copper disc on the end of the spool. Both the front end cap (B), and the back end cap are aluminum die castings. The magnet mounting plate (C) and the front plate (E) must be made of nonmagnetic materials in order for the electrical brake to function properly; both are made of aluminum, the latter being die cast. Other aluminum parts include the crank (A), spiral shaft gear (D), and the spool.

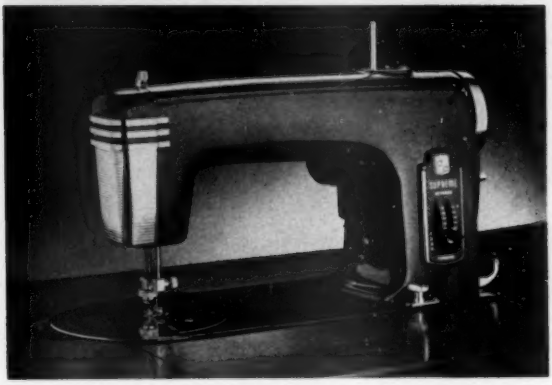
SPECIAL USE of the non-magnetic qualities of aluminum and the economy of die casting make this Electromatic reel a valuable asset in a fisherman's equipment.

Die Castings

U. S.

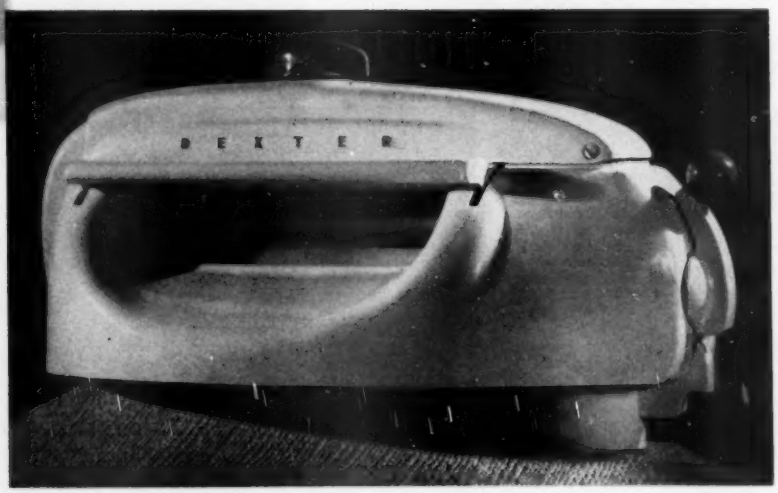
A HEALTHY concern for production methods, sales techniques and manufacturing costs can be discerned in the current crop of product designs gathered together in the recently published book, *U. S. Industrial Design 1951**.

In this impressive second annual volume prepared and edited by the Society of Industrial Designers, certain trends in the selection of materials, finishes and fabricating methods are apparent. The realistic approach of today's designer to the problems of manufacturing and selling is evidence of the maturity of this relatively young profession.



RESULT OF INTENSIVE RESEARCH is this completely redesigned and retooled sewing machine for National Sewing Machine Co. Industrial Designer—Dave Chapman. Chrome plated die castings provide a needed accent.

DIE CAST housing was designed to harmonize with the general atmosphere of a modern office. This IBM time recorder was worked out by the industrial design firm, Sundberg-Ferar in collaboration with George H. Kress, designer for IBM.



CONVENTIONAL TYPE wringer for moderate-priced washers has integral drainboards, frame and gear housing. Two die castings and two stampings provide an easy-to-clean exterior for this Dexter washing machine wringer. Industrial designer — Gifford Mast and Associates, in collaboration with Dexter engineers.

The book incorporates hundreds of photographs showing products designed by members of the society, but even more significant, it includes a wealth of background material provided by the designers themselves, and an overall rationale which explains the function and procedure of the designer.

Thus, the volume presents pictorially and descriptively, the design trends. It should be of value to executives and engineers concerned with product development, and to members of the design profession who wish to maintain a perspective on the work of other designers.

Prominent Use of Die Castings

A casual observer leafing through the book must be impressed with the prominence given to die castings in the designs of these leading practitioners. Among products fabricated from metal, the die casting process and the tangent bender seem to be particularly well adapted to the designer's requirements.

For the product designer, the die casting process has two important advantages, one basically economic and the other artistic. On the one hand, it is a method well suited for producing large quantities of complex parts at a low unit cost, thus satisfying stringent accounting limitations; on the other hand, it permits close reproduction of the designer's concept including complex forms and curvatures, contours and structural shapes. It also permits clean, precise detail, smooth surfaces and exact control of form.

The few illustrations from *U. S. Industrial Design 1951* which are reproduced here, indicate the trend toward utilization of quantity-production methods for satisfying product forms.

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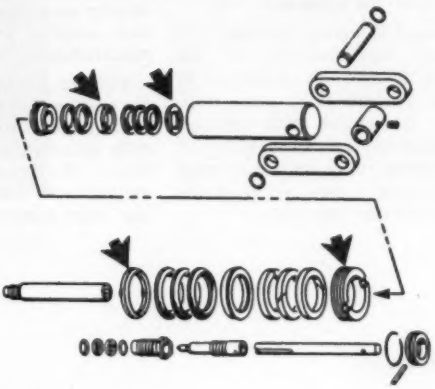
* Studio Publications and Thomas Y. Crowell Co., 432 Fourth Ave., New York, 190 pages, $10.

Featured in

INDUSTRIAL DESIGN 1951

TWO-PIECE die cast housing gives a neat, strong and readily finished exterior for this battery lantern designed for Delta Electric Company by industrial designer Viktor Schreckengost.

1. FOR THE V-SECTIONED chevron packings used in the hydraulic systems of these auto jacks, die cast zinc fittings have been called for. A group of these packing nuts, packing gland nuts, spreaders and spacers are shown at the *left*, while *below* is a diagram showing the way in which they are used. Good bearing properties of the zinc alloy protect the cylinder walls from any scoring or abrasion.



Low Cost Hydraulic Fittings

THE NON-SCORING qualities of zinc die castings make them well-suited for use as packing nuts, packing gland nuts, spreaders and spacers inside of hydraulic cylinders.

These are a few of the many special applications for die castings in the hydraulically-actuated auto jacks produced by the Blackhawk Manufacturing Company of Milwaukee.

The diverse uses for die cast zinc and aluminum parts range from valve bodies to adjusting knobs and from decorative trim to hand grips. They are to be found on the heavy duty service jacks used by garagemen as well as on the light weight bumper jacks carried as emergency equipment by the average motorist.

But wherever they have been specified, die castings have been carefully engineered to do a better job at lower cost than is possible by alternative fabricating methods.

Even in such completely functional equipment as these lifting mechanisms, product styling is an important part of the sales picture. The garage owner who is buying new equipment not only wants the unit which does the best job, but he wants it to *look* as efficient and up-to-date as it is. The use of die castings for exterior components in several places has permitted Blackhawk engineers to obtain the required appearance features

2. SERVICE JACK with capacity of four tons uses a number of die cast parts for three types of components: hydraulic fittings because of their non-scoring qualities; handle parts because of their strength; and decorative trim because of their smooth, clear-cut surface detail.

which the product stylist has called for in his design.

Hydraulic Fittings

The ring-shaped packing fittings employed in these hydraulic cylinders represent a sound and economical use of zinc die castings. A group of these fittings is displayed in Figure 1. Various sizes are called for by different models of jacks.

The chevron packings inside the hydraulic cylinders are firmly held by die cast packing nuts, spacers and spreaders which conform to the V-shaped section of the packings. By virtue of its excellent bearing properties, the die cast zinc alloy rides inside the cylinder without scoring its precision surface.

Close concentricity between the ID and OD and the crest of the V-section can be maintained in the die cast fittings so that the seals are spread equally.

Where needed, grooves are formed in the die castings to distribute oil into the leather chevron packings. Also, small ears on the perimeter of the die cast spreaders minimize the amount of surface which contacts the cylinder wall.

The various packing nuts have slotted heads by which they are turned, since the OD is threaded. These slots or castellations are formed in the die without any additional machining of the die castings, thus representing lowered costs. The same is true of the oil grooves, small ears and V-shaped section, all of which come from the die in finished form.

These packing fittings are used in various models of service jacks, one of which is shown in Figure 2.

Non-Leaking Valve Housing

Other die cast hydraulic components are also used to advantage in certain models. For example, the bumper jack, Figure 6, has a heavy-sectioned die cast zinc valve body.

The valve body, included in

3. ALTHOUGH APPEARING TO BE SIMPLE, the die cast jack handle has a complex coring job which provides integral housing for a battery, guide holes for a control bar, and recess for the trigger.

4. FINGER GRIPS carry out the decorative idea of the designer and also serve a functional purpose.

5. VALVE BODY with complex inner coring needs to be sound and free of porosity in certain critical areas. These five die castings are used in the bumper jack.

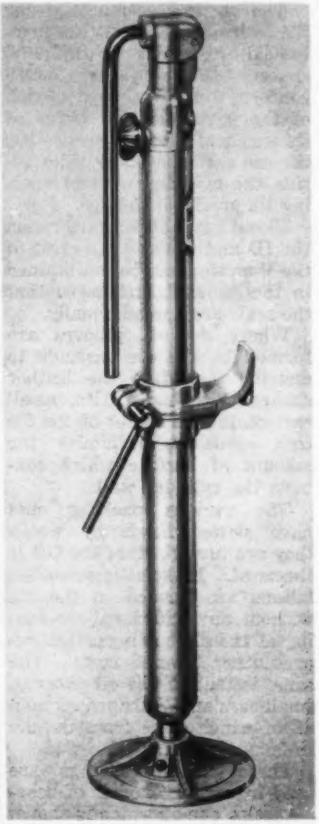
the array shown in Figure 5, needs a sound internal structure since the hydraulic fluid is controlled by valving devices seated in cored and machined passages. Leakage of fluid under pressure from one passage to another cannot be tolerated, and for this reason, porosity in critical sections must be prevented. That this is accomplished by the die caster, using a well-designed die and carefully controlled metal injection, is evidenced by the low rejection rate due to porosity.

In general, die cast components are not specified where stress loads are high, but there are applications in which considerable strength is required. An example of this is the jack handle cross bar for the service jack.

As much as 135 pounds pressure may be applied to this to obtain a 8000 pound lift. Because of the inherent mechanical strength of the zinc alloy, plus the provision of adequate cross section, this handle meets every strength requirement.

The die cast unit is smoother than a comparable malleable handle, thus saving costly grinding and polishing. Smoothness is an essential in any type of hand grip.

One handle bar serves also as a retainer for an electric battery which powers the built-in jack lamp. With a malleable casting, a larger and bulkier



6. BUMPER JACKS such as this unit are built to withstand hard usage for prolonged periods of time.

outside dimension would be needed to allow the same space for housing the battery.

An interesting coring job provides two internal holes aligned to serve as integral brackets in which a vertical control rod moves. Although this casting serves several purposes in addition to being a heavy duty handle, few machining opera-

(Continued on Page 55)

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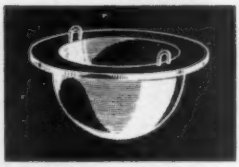

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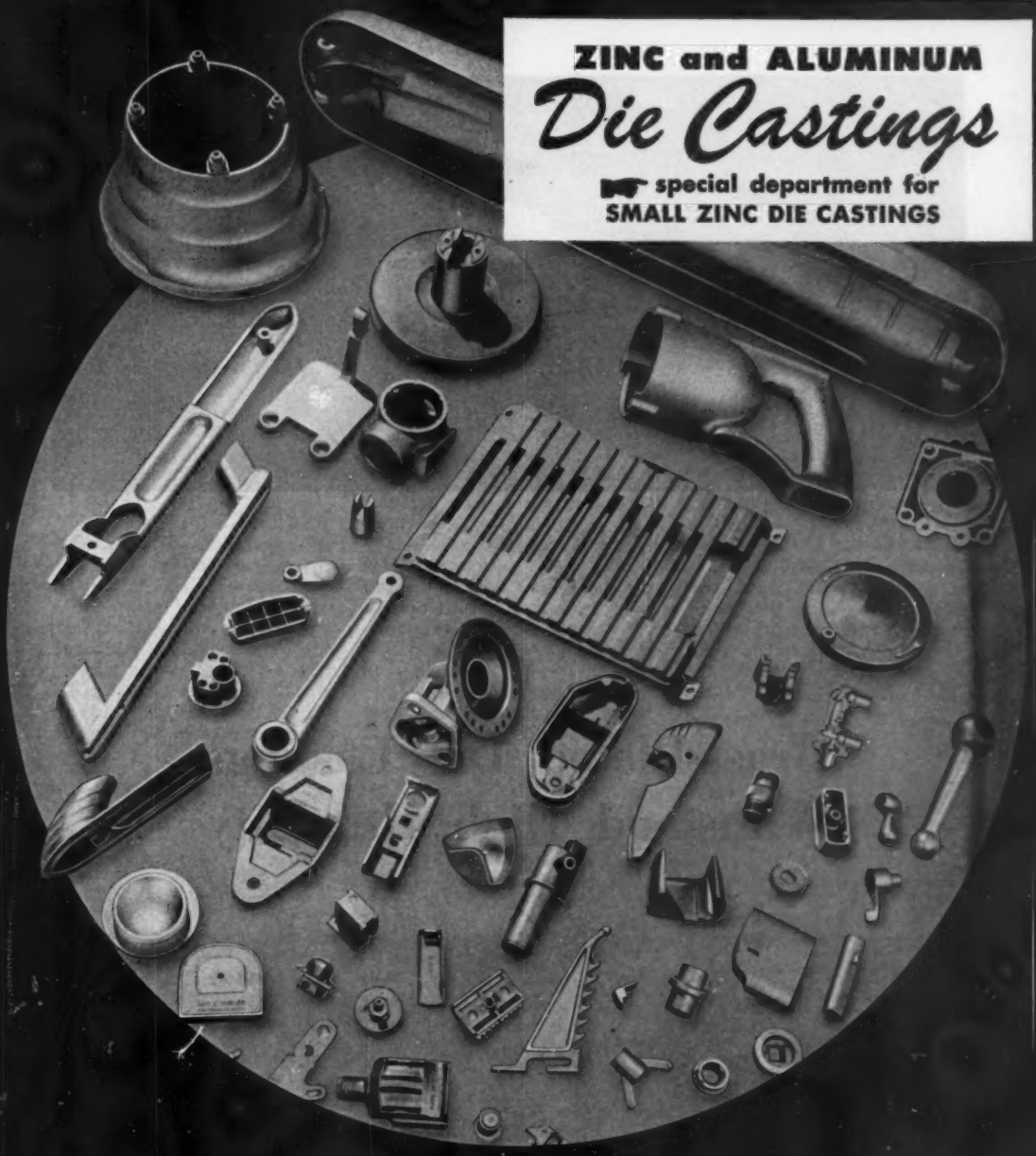

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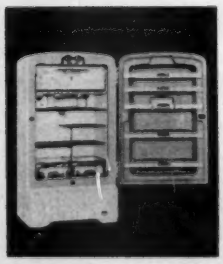
Brass-Plated Die Castings Withstand High Humidity

TWO-COLOR INTERIORS in gold and chartreuse have been worked out by Crosley designers for this custom model Shelvador refrigerator.



A BRIGHT brass plate that matches gold in color and is amply protected against the conditions of humidity occurring inside a refrigerator has been achieved on zinc die castings used for trim on the Crosley Shelvador custom model.

Believing that many housewives would welcome the introduction of color to relieve the austerity of conventional all-white refrigerator interiors, Crosley designers worked out a suitable color combination. After studying hundreds of combinations, they selected one which adds the desired warm tones, provides a harmonious background for food and blends well with most kitchen decor.

The colors they chose were a soft chartreuse accented with bright gold trim. The next problem was tossed into the laps of the production engineers . . . how to match these colors.

The chartreuse background is introduced in the lining of the refrigerator, but the bright gold trim presents more of a problem. The expense of setting up a special gold plating line could not be justified, so a brass alloy that would have the desired color was sought.

The alloy which furnished a gold coloration of the desired hue was found to be 85-15 brass, and the die casting supplier undertook to apply a brass plate to meet this specification. This he has been able to do, but the color of a brass plate is very sensitive to process varia-

PLATED with an 85-15 brass and protected with a newly developed clear coating, these zinc base die castings have withstood more than 1000 hours of exposure to a 100 percent humidity test at 110°F. They have also come through well in abrasion, perspiration and sulfur testing.

bles, so that extremely close process controls have had to be set up.

In order to obtain an exact color match, three variables must be controlled: temperature, current density and free cyanide. For example, temperature of the plating bath must be held within ± 1 degree.

However, in addition to strict color specifications to be met, there are even more critical performance standards to which these brass plated zinc die castings must conform. Spotting or discoloring of the plate in service cannot be tolerated, despite exposure to constant humidity, as well as perspiration. It must also withstand the abrasive action of normal cleaning.

To protect the bright brass plate, a clear baking lacquer is applied. Many months of experiment were devoted to the problem of a suitable protective coating until one was discovered which is capable of withstanding the accelerated performance tests.

The clear coating, a recently developed product of United Chromium, Inc., has displayed service life in excess of the most severe specifications.

Exposed to a 100 percent relative humidity test at 110F, the coating has held up in excess of 1000 hours without any sign of deterioration of the protective film.

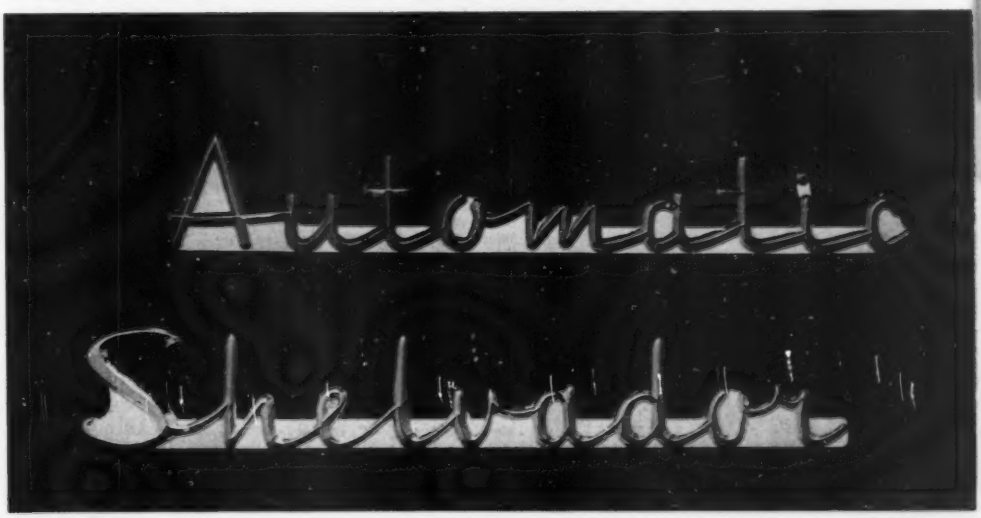
To test its abrasion resistance, the brass plated die casting with protective finish was placed in the Taber Abraser and withstood 1800 revolutions of a CS10 wheel with 1 mg weight per mil of thickness of dry film.

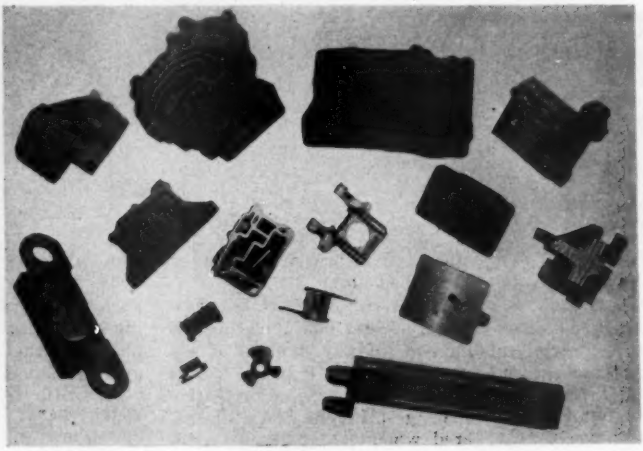
The finish has also been subjected to a 24-hour synthetic perspiration test and also a sulfide test to determine any tendency toward discoloration.

Here, one of the most difficult finishing problems on die cast zinc has been solved, the application of a bright brass plate of carefully specified color which holds up when sub-

(Continued on Page 54)

FOR NAMEPLATES, die cast zinc is especially well suited. The intricate contours are readily obtained from the die, and the mounting bosses on the rear are produced as an integral part of the name plate.





1. TYPICAL DIE CASTINGS and similar parts lapped in production runs to surface specifications which allow elimination of gasketing between joint surfaces, are these components, including valve bodies, transmission parts, vacuum control parts, gas metering devices and switch box. The transmission part, *upper right*, has been lapped on both sides and two edges to insure leakproof operation.

Gaskets Can Be Eliminated By Lapping

By RICHARD J. BROWN
Mechanical Engineer
Crane Packing Company

JUST AS precision grinding on a production basis came into its own about ten or twelve years ago—and thus opened a wealth of new production economy possibilities to industry—the operation of precision lapping is today in the first stages of a period of tremendous growth.

Flat lapping is a term understood by most die casting engineers and production men as a means of generating extremely flat and smooth surfaces, but it

2. BENCH MODEL machine, with 12" lapping plate, illustrates lapping method of all Lapmaster models. Cast alloy metal lap plate (7) rotates at constant speed and is controlled by switch (1) and timing clock (2). Conditioning rings (5) rotate in their own orbits by action of the lap plate and act to constantly maintain lap plate flatness. Thoroughly mixed lapping compound is fed from an agitator tank (4) to the side of one of the conditioning rings via a feed track (3) and is distributed over the lap plate by the rotating action of the plate. Parts being lapped (8) are placed inside the conditioning rings and, when necessary, light pressure plates (6) are superimposed on them. Standard models are manufactured with plate diameters of 12", 24", 36", 48" and 72".

MACHINE LAPPING of die castings to cut manufacturing and assembling costs is gaining wide notice among users and producers of die castings. A few actual and potential applications for this process are for joint surfaces of cylinder blocks on outboard motors, small gasoline engines, torque converters, valves, pumps, carburetors, liquid metering devices, fuel pumps and other constant or intermittant sealing applications. A new machine makes possible the production lapping of soft metals, irregular shapes and an unlimited range of sizes. Low cost and more effective sealing are gained.

has usually been considered a slow time-consuming hand operation requiring skills acquired by years of apprenticeship. Machines capable of achieving production lapping are not new. Unfortunately, however, the several which have been on the market for the past decade have not had much application to die castings because they could not handle the variety of shapes normally die cast.

The past several years have seen the introduction and development of a new type of lapping machine, the Lapmaster, which is designed to handle wide varieties of part sizes and shapes in production operations. A number of manufacturers were quick to see its possibilities in the die casting field, and a number of them have already inaugurated the lapping of joint faces to eliminate gaskets.

Lapped Metal vs. Gasket Seal

The lapping of die casting joint faces to eliminate gaskets probably comes as a new idea to most production men. Yet, on analysis, the thought is very sound. It's pretty generally known that a metal-to-metal joint between two flat surfaces seals better under pressures than does a gasketed joint. There is no waviness through which liquid or gas could pass when two mating faces are both extremely flat; similarly, when surfaces are smooth there are no valleys between the high points to allow leakage. Another advantage to this method of eliminating gaskets is exact dimensional control of location of internally held parts by removing the possible built-up error resulting from variations in gasket thickness and compressibility.

The terms flatness and finish (smoothness) are often confused. Actually they're not even directly related. Flatness is considered as the deviation from an absolute plane over the total area and is measured in millionths of an inch by means of light bands as viewed through an optical flat under a one color light source.

Finish refers to the roughness over a short distance and is indicated by microinch deviation from a base surface by means of an electronic measuring instrument which can measure the peaks and valleys to find the average (RMS) deviation. If a joint is to be leakproof, the two surfaces must be both flat and smooth.

Generally speaking, die castings are used as mating parts in two types of assemblies—those involving relatively high pressures, and those which are not under much more than atmospheric pressure. The latter usually do not require any machining operations after casting, and can safely be assembled with an inexpensive gasket.

Lapping has many applications to the joint faces of die castings which do not seal off more than atmospheric pressures. However, in higher pressure applications when the casting must first be taken from a machining operation such as milling, lathe facing or abrasive wheel belt or disc sanding, then precision ground, and fi-

TABLE 1
LAPPING CAPACITY CHART

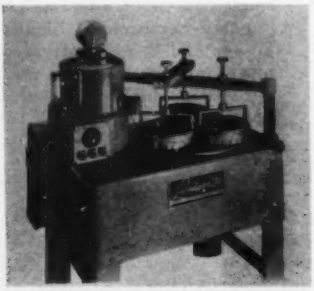
Dia. of Piece	12" Lapmaster Parts per cycle	24" Lapmaster Parts per cycle	48" Lapmaster Parts per cycle
1/4"	360	1804	—
1/2"	105	544	—
3/4"	54	256	—
1"	33	180	764
1 1/2"	15	80	352
2"	6	44	200
2 1/2"	3	28	124
3"	3	16	88
3 1/2"	3	12	64
4"	3	8	48
4 1/2"	—	4	36
5"	—	4	32
5 1/2"	—	4	28
6"	—	4	20
6 1/2"	—	4	16
7"	—	4	12
7 1/2"	—	4	12
8"	—	4	8
8 1/2"	—	3	4
9"	—	3	Up to 16 15/16" Dia

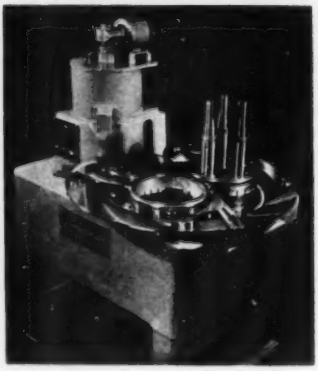
nally carefully gasketed — significant savings can be effected by lapping instead of grinding and gasketing.

Soft Metals Do Not "Load" Lap Plate

As mentioned before, conventional lapping machines have never been applicable to the die casting field. The reasons for this are several. It was found that soft die cast materials immediately "loaded" the vitrified stone lapping surface on some lapping machines, destroying their ability to generate precision surfaces. Excessive downtime for reconditioning of the lapping wheel made production output small. Other lapping machines were, by nature of their design, geared to handle only thin, regularly shaped parts—while most die castings are frequently complex in nature.

With the Lapmaster, production precision lapping is not only possible, but—and this is hard to believe at first—*it is frequently faster and cheaper than precision grinding. This machine can lap soft metals without loading the metal lap surface, it can handle an extremely wide variety of sizes and shapes (including various ones in the same operation), it operates continuously without downtime for reconditioning of the lap plate and it can be run by relatively low-cost inexperienced help.*





3. ALTERNATE methods of adjusting conditioning rings, depending on type of parts to be lapped are available. Illustration at top shows a "spider bar" arrangement which allows rings to be moved radially, inward or outward. When unusually tall parts are to be lapped, a roller attachment as shown below is recommended for necessary overhead clearance.

Operation of the unit is simple. A special cast metal alloy lapping plate rotates at a constant speed and is controlled by a timing mechanism which automatically stops it at the end of a pre-determined lapping cy-

(Continued on Page 56)

We've Never Cracked the SONIC Wall, BUT...
We have knocked many a Production Record for a Loop!
WE don't emphasize speed at Badger—QUALITY is our first consideration. But when our customers need die castings in a hurry, "Speed" becomes our middle name. And as for production records—they fall like tin soldiers.
Why not discuss your product problems with us? The economies of Badger die castings could well mean the difference between winning new markets in 1951 or losing your old ones.
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FINISHING DIE CASTINGS

A SECTION DEVOTED TO THE FINISHING PROCESSES

MACHINING—Most die castings require some machining operations. In this section will be found information to aid in planning and selecting the proper method and equipment for these operations.

ASSEMBLING—Die castings are generally assembled components. This section includes information on fastenings and methods for mass production assembly operations.

SURFACE FINISHING—Most die castings receive some type of surface finish such as plating, organic coating, anodic coating or chemical coating. This section contains information on the methods, processes and equipment used for the various surface finishing treatments on the die casting alloys.

Backstand Method Saves Time!

Toledo Steel Tube Co. saves 2 hours per operator per day in finishing department

The Toledo Steel Tube Co. uses the backstand belt method to remove burrs and grip marks from the tubing. This company points out the following advantages of the backstand belt method over the set-up wheel method:

1 Time is not lost in making set-up wheels. Formerly the operators were given 2 hours a day for making their set-up wheels.

2 One backstand belt will outlast 4 to 5 set-up wheels for this application.

3 Belts maintain a flat surface for the grinding and polishing operation, whereas set-up wheels became rounded and needed dressing from time to time.

4 The uniform grit on the belts gives a much better finish on the tubes than did the rolled-on grit of the set-up wheels.

Manufacturers of hundreds of different industrial and consumer items have proved that the backstand belt method is more efficient and more economical than the set-up wheel.

If you are grinding, polishing or finishing flat or contoured surfaces, cast pieces, stamped pieces or forged pieces, the backstand belt method can help you with your production problems.

To learn more about the many advantages of the backstand belt method, write today for our free booklet.

We recommend buying through your industrial distributor

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Please send me the booklet "Facts about Backstand Belt Grinding and Polishing."

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PRODUCTION CLINIC
for finishing die castings

A monthly digest of current technical progress selected and prepared by the editorial staff of DIE CASTINGS. This section is devoted to finishing processes for all types of die castings, and is written specifically for the benefit of the production man.

FLOCK FINISHING

A "new look" finish that has had many novelty applications, flock coating has lately been branching out into the utility finish field. Its durability and resistance to handling, together with sound and glare damping ability, make this method of finishing a natural for many die casting applications.

A FINISH for a product is not always chosen on the basis of appearance alone. In many instances, a finish originally specified has been discarded because, while it gave the desired appearance, it was undesirable from the standpoint of ease of application, consistency of result, wearing properties or other special requirements.

One finish that has been steadily gaining in application is flock coating. Flock has a number of properties which, when combined, give an unusual finish unobtainable with any other surface treatment. Among these properties are: 1) a suede or leather-like finish, or in other instances, one with a deep-pile fabric effect; 2) comparatively easy application; 3) simple pretreatment; 4) a mar-proof, snag-proof surface with good wearing properties; and 5) in the case of rayon flock, a sound deadening effect.

What is Flock?

Flock coating consists of short pre-cut fibers imbedded in an adhesive. The variables, other than the adhesive, are the denier (a unit of yarn size based on the weight of a standard length), color, material, length of the fiber and density of the pile.

Denier is a term generally used only in connection with rayon, nylon and other synthetic materials, as it is possible to control the diameters of these fibers during the manufacturing process. Cotton, wool, hair and the other organic materials are not subject to such control.

Color treatment is not usually given to hair flock, but the other materials are available in white and a score of standard colors. Other colors to match the buyer's sample may be produced by vat dyeing with either commercial or color-fast dyes. When colored flock is used, it is common practice to use a similarly colored adhesive.

Materials which can be used for flock coating are many and varied. Asbestos, mica, vegetable fiber, animal hair, nylon, cellophane, spun glass and many other materials have been used successfully. Because of the superior results obtained, cotton, wool and rayon are the commonly used materials, and con-

One of the many uses for flock coatings is photographic parts. In this plant, die cast enlarger housings receive an interior coat of black flock. The workman on the right is applying the flock. Adhesive application is not shown. Photo courtesy Elwood Pattern Works, Inc.

stitute the major sources of flock supply.

Length. Flock is supplied in a variety of lengths, and the final result depends greatly on the length of flock used. There are three general classifications of flock length: random-cut, precision-cut and ground. Of the commonly used materials, only rayon can be precision-cut. Wool and cotton flocks are made from waste material which cannot be held to a tolerance in cutting.

Precision-cut rayon flock is supplied in various lengths from .015 to .125. Tolerance is maintained at ± .002. One flock manufacturer states that the most popular lengths are .020, 1/32 inch and 1/16 inch. It is this close tolerance that gives rayon precision-cut flock its deep-pile effect.

Random-cut flock is screened after being cut. The number of screening classifications vary, but a general idea may be obtained from one flock producer's practice. The flock, after being cut, is sifted through a series of screens, with classifications of 30 mesh, 40 mesh and 60 mesh, the mesh number indicating the number of openings per square inch. Random-cut flock surfaces have a duller and more varigated appearance than do the precision-cut flocks.

Pile Density is the most difficult to control of all the variables. The thicker coverings give a longer-lasting, richer-appearing surface. Pile thickness can be controlled to some extent by strict attention to detail in application of the flock.

Which Flock Where?

In general, the choice of flock material is made upon consideration of the type and quality of the surface desired and the cost. By close control of the variables, a number of different types of finishes can be obtained, with varying properties and appearances.

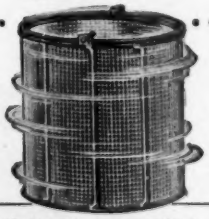
THE INTERIOR of this photographic enlarger is coated with black flock. The flock absorbs light reflection which would prevent proper operation of the enlarger. Photo courtesy Elwood Pattern Works, Inc.

Rayon is considered the most popular material, and seems to be the most versatile. It is available in all three cuts, and denier can be controlled accurately. Precision-cut, it offers the richness of a velvet, plush or velour-like covering. Random-cut rayon has the appearance of sueded leather. In addition, rayon has excellent acoustical and insulating properties.

PAYS FOR ITSELF... IN TIME SAVED

Kreider Dryer with auxiliary steam heating unit (illustrated). Auxiliary natural gas heating unit available; also standard model without auxiliary heating.

Basket (below). Heavy gauge woven steel mesh over steel frame. Capacity, 1140 cu. ins.



Spin-Dries* up to 50 pounds in less than 2 minutes

Saves drying time. Kreider Dryer operates on ¾ h.p. at 625 r.p.m. . . . cuts drying time to as little as 35 secs.—no more than 2 mins.—for each 50 lbs.

Saves production time. Runs at top speed with maximum load, hour after hour, day after day. Ends drying "bottle necks". . . assures smooth, evenly dried surfaces, longer lasting lustre—fewer "rejects."

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New Holland Machine Co., New Holland, Pa.

*Only 2 simple steps required . . .

(1) Operator places wire mesh basketful of small parts in Dryer . . . turns motor "ON."

(2) Operator turns motor "OFF" . . . presses foot brake . . . removes basket.

NEW HOLLAND KREIDER DRYER

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All of the operations at Stevens are in clean, well-lighted, dust-free rooms to insure finest results in the finished product. Finally the compositions are packed in protective containers and stored in a cool, dry vault until shipment.

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If you have a polishing or buffing problem—send the complete data to us. Our technical staff will analyze your operation and recommend a solution—without cost or obligation.

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FREDERIC B. STEVENS INCORPORATED

DETROIT 16, MICHIGAN

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Cotton flock has the appearance of sueded leather or napped cloth. Because of its irregularity in length and diameter, it has a duller finish than that of the precision-cut fibers. This dullness can be used to advantage in such applications as lining cameras and other photographic equipment, where a glare-proof lining is required. Since it is made from waste material, it is less expensive than rayon and the other manufactured fibers.

Wool flock is used less than either cotton or rayon. Like cotton, it is made from waste material and is difficult to cut with any degree of accuracy. The finish produced is harsh and wiry because of the stiffness of the wool fibers. This adds greatly to its wear resistance, which is one of the major reasons for its use. The cost of wool flock is increased somewhat by the amount of processing necessary to remove the animal oils and foreign matter from it prior to cutting. In general, wool flock is used to produce a dull, wear-resistant surface.

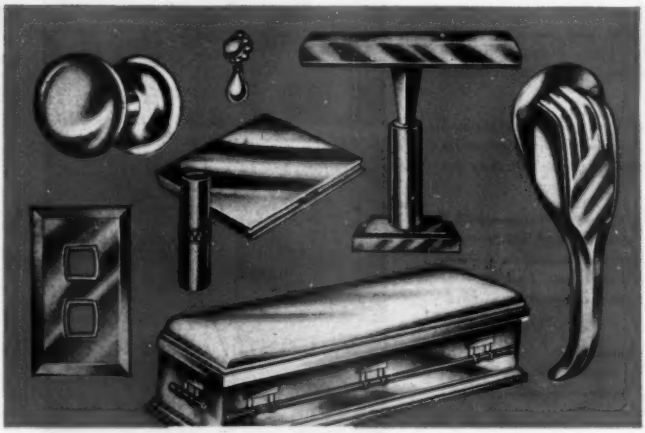
Other materials used for flock coating do not have enough present application to justify treatment at any length here. It is not difficult to visualize, for instance, the surfaces that would be produced by coating with mica or spun glass. These materials all have special problems in application, and the desirability of an unusual finish must be weighed against the wealth of practical experience and background offered to the user of the more common fibers. It would appear, however, that several of the new synthetic fibers, such as Orlon, will find wide application in the flock field. These fibers by nature should have properties similar to rayon, but may surpass rayon in some aspects.

SOUND DEADENING properties of cotton flock coatings can be used to good advantage on the interior of business machine housings, such as the die cast adding machine housing, above. The quiet operation which results can be used as a strong selling point for the finished product. Photo courtesy Claremont Waste Mfg. Co.

What Adhesive Should Be Used?

The importance of the right adhesive, properly used, cannot be overstressed. No flock coating is any more wear-resistant, lasting or proof against chemicals and water than the adhesive that holds it. In order to give the best results, an adhesive must be used which meets all the requirements of flock coating.

Among the required properties are good adhesion to the



NOW...simulate copper, brass and bronze on products like these with M & W PLATELUSTRE

Don't let critical metals put a *needless* crimp in your production!

Take zinc or steel—apply a coating of one of the new PLATELUSTRE finishes. You wind up with products and parts that look so much like copper, brass and bronze that *the eye can scarcely tell the difference!*

Whether you have been using now unavailable copper and its alloys for *making* products or for *plating* products, you will find these new M & W finishes *equally* effective in keeping your plant running. There are types for air-drying and baking schedules—pick the one that best fits *your* production requirements.

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MANUFACTURERS OF INDUSTRIAL FINISHES

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base metal and to the fibers. If an enamel is used which has a tendency to crack or peel, the flock is going to come off with it. The adhesive must remain "wet" long enough after application to give time to apply the flock. If the film becomes tacky before flock application, the flock will not adhere to the surface properly. The film must flow on evenly, and must be applicable in thicknesses of .005 or less. Too thick a film will result in an uneven coat, while poor adherence will be caused by a film that is too thin.

Special Flock Adhesives, marketed by many paint and adhesive manufacturers, will probably give the best results on die castings. These adhesives are based on a synthetic resin, usually alkyd, and have comparatively long open times, are easily applied and have excellent base and fiber adhesion.

Water-Soluble Glues can be used where there is no danger that the part will later be subjected to dampness or friction. These glues have a brittle film which flakes off more readily than do other films; however, water soluble glues are more economical than are the other adhesives.

Rubber Adhesives, both water-dispersion and solvent-type, are used for flock coating where flexibility is necessary, although the water-dispersion type does not give good results on die cast or other rigid surfaces.

Enamel can be used as a flock adhesive if it has a long enough open time or if production facilities allow for immediate flock application after the adhesive has been applied. Although enamel appears wet for some time after application, it quickly forms a surface skin which resists the penetration of the fibers. The enamel dries with a high gloss, and unless a thick coating of flock is applied, light reflection will result to the detriment of appearance. The enamel should be pigmented to coincide with the color of the flock being used. If the enamel is later baked,

IF YOU WANT TO

ELIMINATE GASKETS

ON PARTS LIKE THIS...

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LAPMASTER

Expensive gaskets for this 9⅝" long, intricate cast aluminum body have been eliminated with a 48" Lapmaster by lapping the joint surface flat to an all-over light band pattern. Pressures up to 3500 psi can be sealed when mating faces (of sturdy pump parts) are lapped to this tolerance.

The Lapmaster 48" readily handles large and small parts of a wide variety of shapes and materials in production runs. *This machine does not require conditioning of the lap plate, it uniformly distributes "wet" lapping compound, and it operates with practically no maintenance.*

96 Parts Lapped Per Hour

Production on the valve body part shown above is maintained at the rate of 8 parts per five minute cycle. The machine is equipped with 4 lap-conditioning rings each holding two parts.

Get the Facts on Better Lapping Production and Accuracy—

Investigate the production and accuracy possibilities of Lapmasters. This 16 page book contains valuable information on this remarkable new lapping method. Write on your company letterhead today. Dept. DC 4, 1846 Cuyler Ave., Chicago 13, Illinois.

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excellent fiber adherence will be obtained.

Lacquer is seldom used as a flock adhesive because of its quick drying action. Where production speeds allow for immediate flock coating after the lacquer is applied, it will be found an adequate adhesive.

What Are the Problems of Application?

Production application of flock can be divided into three parts: surface preparation, adhesive application and flock application.

Surface Preparation. In flock coating die castings, the finisher will be confronted generally with the same problems incurred in organic finishing. The surface must be smooth, clean and treated to prevent oxidation of the adhesive.

It is a popular misconception that flock coatings can be used to cover a poor surface. While it is true that flock in certain lengths will hide minor irregu-

(Continued on Page 51)

COMPARE

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ALUMINUM FINISHING PROCESS

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IRIDITE® Al-Coat

—see for yourself why more and more finishers of aluminum products are specifying Iridite Al-Coat for any wrought, cast or buffed aluminum part.

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Faster—Just one simple dip, 10 seconds or only two minutes, depending upon your finishing specifications. No sealing dip, no special drying.

Simpler—Non-electrolytic, no heating or exhaust units, operates at room temperature. No special precleaning baths required.

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Clear—Protects metal without changing its original appearance.

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Corrosion Resistance—Up to 1,000 hours salt spray on wrought stock, 250 hours on castings. Approved under government specifications.

Abrasion Resistance—Will not flake or peel from buffing, beading or scraping.

Paint Base—Blocks undersilm corrosion; grips paint, holds it firmly.

Welding—Finished surface can be spot welded, coating actually aids shielded arc welding.

Conductivity—Offers low surface resistance to electrical current.

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Comparative figures show that Iridite Al-Coat saves as much as 50% over other aluminum finishing processes. *Let us prove this to you.*

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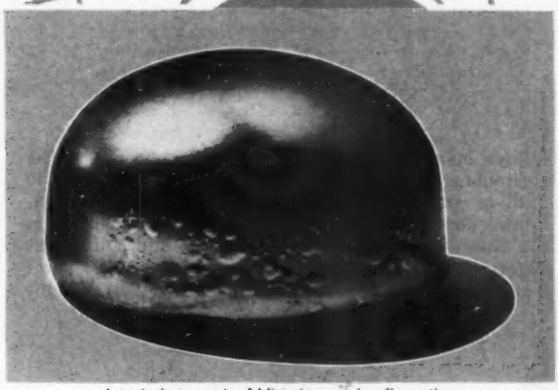
STOP BLISTERING, STREAKING

ON ZINC BASE DIE CASTINGS!



Actual photograph of blistering on zinc die casting cleaned with conventional cleaner.

Designed especially for reverse current electro-cleaning of zinc base die castings prior to electroplating, new Diversey No. 505 completely, safely removes all unwanted deposits! In addition, Diversey No. 505 conditions the surface of the zinc, providing better adhesion between the electro plate and the base metal!

This unique, double-action of Diversey No. 505 helps provide a uniformly clear, brilliantly lustrous finished surface . . . one free from blistering, peeling and streaking! Diversey No. 505 is economical, easy to use and available now! Investigate Diversey No. 505 today! *Mail the coupon for FREE copy of New Bulletin.*

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A Production Line Report:

Several Finishes Applied by Versatile Plating Set-Up

To produce cigarette lighters with a jewelry finish on die cast zinc or brass parts requires the most meticulous handling from the polishing and cleaning all the way through final plating and inspection.

American Safety Razor Corporation, Brooklyn manufacturers of a line of table and pocket lighters as well as razors and blades, have developed a versatile production line capable of applying a variety of plated finishes to die cast and stamped parts.

In addition to chromium, the ASR plating department is equipped to turn out rhodium, copper, silver and gold plate. Because of the difficulties involved in scheduling several types of finishes on a large num-

(Continued on Page 52)

1. THREE COTTON WHEELS on the spindle of a buffing lathe are used to cut down and color the body for the ASR Classic table lighter. One operator can handle the three operations in rapid succession on a L'Hommedieu buffing lathe.

With the spindle turning at 1800 rpm, the body is first cut down with a Lea type K compound on a stitched buff, following which it is buffed with tripoli on a loose buff and given a final coloring with white rouge on another loose buff.

2. **CLEANING CYCLE** for the Classic lighter body, die cast in zinc alloy, includes a vapor degreasing using trichlorethylene, a 30 second immersion in an alkaline soak cleaner, an electrocleaning and a three percent hydrochloric acid neutralizing dip.

The electrocleaning consists of the application of reverse current for about 30 seconds in a mild alkaline bath. Reverse current is employed rather than direct current so that oxygen is released instead of hydrogen, thus avoiding the pitting and other plating defects traceable to free hydrogen.

3. **COPPER STRIKE** in a low metal-high-cyanide solution produces a thin deposit in the order of 0.00010 minimum. This is followed by a water rinse and goes immediately into the bright copper bath.

Periodic reverse current copper cycle consisting of 12 seconds direct and two seconds reverse produces a bright surface in about five minutes. A Wes-X brightener in the bath contributes to the quality of the plate, which is about 0.00025 minimum thickness. Water rinse follows.

A McGean bright nickel bath gives a minimum of .0005 plating, and is followed by the rhodium plate, employing a phosphate type bath with two minute immersion at 40 amperes per square foot. Rhodium, which is a non-tarnishing bright plate with a warmer hue than chromium, plates at 100 percent efficiency. Note: All data and photographs were obtained prior to recent metal restrictions.

4. **RELATIVELY SIMPLE** single operation machines are used for most operations on die castings for ASR lighters. Single spindle drill press, small milling machines, tapping units and arbor presses for staking are typical equipment for machining and forming.

The die cast zinc tank for the Windproof pocket lighter provides examples of characteristic machining setups. Two sides of the tank and two protruding ears are machined simultaneously in a gang milling operation. Carbide cutters are used.

Because of differences in diameter between the two cutters, a compromise speed of 500-600 rpm has been selected for this gang milling operation on a U. S. Multi-Miller.

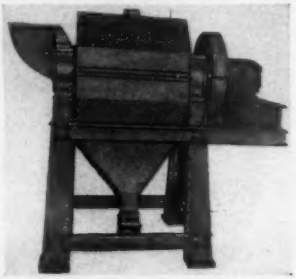
Parting lines on this same die cast tank are removed in another milling operation which establishes parallelism between sides at the same time. Other operations on the part consist of line drilling holes for a pivot pin, staking in a flint tube with an arbor press, milling off a small bit of metal displaced by the press, and tapping a small hole for a spring.

NEW PRODUCTS

For additional information on the products appearing on this and the following pages, mark the key number of the item on the card bound into this issue. Drop the card in the mail—no postage is required.

EXTRACTING GOOD METAL FROM DIE CASTING DROSS BY DRY PROCESS

Peerless Dry Process Metal Separator No. 1 and No. 2
Peerless Metal Separator Co., New York City.



SPECIAL FEATURES. Designed for use on non-ferrous metals including zinc, aluminum and magnesium die casting alloys. The unit will extract good metal from skimmings, slags, dross and sweepings in die casting plants.

SPECIFICATIONS: Operation is fully automatic and does not require the attention of a skilled operator. No heat or water required. Unit recovers waste metal at once and makes it available for immediate resmelting. Gives 50 to 80 per cent metal recovery. Two sizes available, No. 1 for small and medium sized plants, and No. 2 (with three times the capacity of No. 1) for large plants.

For additional information circle No. 92 on the Reader Service card.

BRONZE LACQUER SIMULATES PLATING

Metallic Bronze Lacquer
National Lacquer & Paint Co., Chicago.

SPECIAL FEATURES: These lacquers are designed to simulate the appearance of a plated metal surface. Color and reflectivity are the same when viewed from any angle. Manufacturer warrants them to be light-fast and non-fading. No dyes or bronze powders are used. Complete pigment dispersion is obtained by patented process.

SPECIFICATIONS: Standard line consists of 15 shades with others available on special order. Lacquer claimed by company to be non-caking, non-jelling and relatively non-settling. Controlled particle size gives greater luster. Samples or trial finishing offered.

For additional information circle No. 93 on the Reader Service card.

CLEAR FINISH FOR ZINC

Dulac Clear Universal Lacquer No. 462
Codur Clear Synthetic Y743
Maas & Waldstein Co., Newark, N. J.

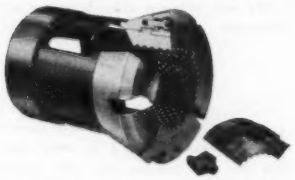
SPECIAL FEATURES: These clear finishes are for use on zinc die castings and zinc plated parts. Die castings treated with these finishes are said to show no discoloration after long periods of service .

SPECIFICATIONS: Dulac No. 462 is for air-drying application and Codur No. 743 is used with baking equipment. Both have demonstrated ability to stand up under salt spray and weatherometer tests for periods up to 800 hours.

For additional information circle No. 94 on the Reader Service Card.

"QUICK CHANGE" MASTER COLLET

"FL" Quick Change Collet
Sutton Tool Co., Sturgis, Mich.



SPECIAL FEATURES: Pads can be changed without removing collet from machine spindle. Improved holding mechanism to prevent slippage from bar thrust. Diamond serration holds work against horizontal and rotating thrusts.

SPECIFICATIONS: Made from heat treated alloy steel. Special fixtures used to aid in holding accuracy of taper and concentricity of hole and threads. Collet will handle all sizes and shapes of stock within capacity limits.

For additional information circle No. 95 on the Reader Service card.

MULTI-USE PRIMER FOR ALUMINUM

Multi-Use Primer
James B. Sipe & Co., Pittsburgh.

SPECIAL FEATURES: Can be used on any clean aluminum surface. Can be used either for air-drying or baking. Will stand up for at least a year without appreciable sign of corrosion.

SPECIFICATIONS: Primer reduces with toluol or xylol for

(Continued on Page 48)

Cowles SM CLEANER

a non-foaming cleaner

for 1 . . . use as an electrocleaner (cathodically, anodically) on steel when exceptionally high current densities, tank design or type of work tend to produce excessive foaming.

2 . . . use as a detergent in all types of washing machines for die castings, steel, brass and copper.

Because it is formulated with water conditioners, Cowles SM Cleaner is especially effective under hard water conditions.

prompt shipments from convenient warehouse stocks

COWLES TECHNICAL SERVICE
gladly furnished upon request

COWLES CHEMICAL COMPANY
METAL CLEANER DEPARTMENT
7016 EUCLID AVENUE • CLEVELAND 3, OHIO

Circle No. 41 on Reader Service Card for more information.

New Arrival

TYPE "OS"

HYPREZ DIAMOND COMPOUNDS

for FINISHING DIE CASTING DIES

Same quality, same grades, same prices as "W" compounds which remain the universal diamond abrasive for finer, faster finishing.

All Hyprez Diamond Compounds are formulated of accurately-graded diamond particles of lasting cutting power—evenly and permanently suspended in a scientific vehicle.

Now Two Types

Available in 18-gram and 5-gram color-identified, dust-proof cartridges for use with the Hyprez Applicator Gun.

Write for free demonstration or complete description to Dept. D-451

HYPREZ DIVISION
ENGIS EQUIPMENT CO.
431 S. DEARBORN ST. CHICAGO 5, ILL.

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PREP PRODUCTS

for Cleaning · Rust-Removing Etching · Phosphatizing and General Metal Conditioning of all kinds of Metal Surfaces

BEFORE PAINTING

Metalprep · Prep-n-cote
Lyfanite · Galvaprep
Prep-pik-l · Rust-preev
Alumiprep · Emulsoprep

MEET MILITARY SPECIFICATIONS

Write for Literature

NEILSON CHEMICAL CO.

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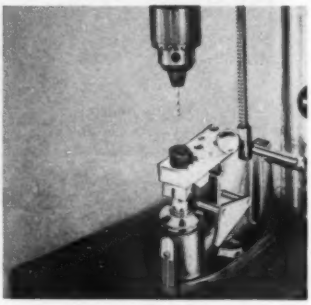
Circle No. 19 on Reader Service Card for more information.

spraying or dipping. Can be cured simultaneously in one-bake operation with top coat. Dries in 15 minutes at 300 F. 10 minutes air drying is sufficient for handling. Available in gray, red, yellow and black.

For additional information circle No. 96 on Reader Service Card.

SIMPLIFIED DRILL PRESS JIG

Model X750 Kam-Grip Drill Jig
Manufacturer's Engineering Service, Toledo, Ohio



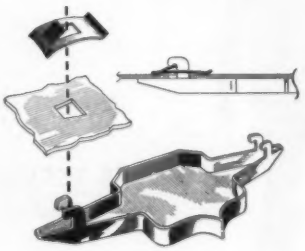
SPECIAL FEATURES: Designed to aid in close tolerance drill press operations at production rates. Set-up time has been reduced by elimination of one bushing plate and one double-end anvil.

SPECIFICATIONS: One bushing plate is required to accommodate a range of standard drill bushing up to 11/32 drill size. One double-end anvil will handle work diameters from 1/8 to 3/4. Jig can be operated manually or automatically by the drill press spindle.

For additional information circle No. 97 on Reader Service Card.

SPEED CLIP FASTENS INSIGNIA

Push-On Type Speed Clip
Tinnerman Products, Inc., Cleveland.



SPECIAL FEATURES: This device was designed to fasten insignia to the glove compartment doors of automobiles, but could be used on many similar operations. Installation is quick and easy, and the fastener has a rattle-proof grip.

SPECIFICATIONS: Speed Clip is an arched piece of heat treated spring steel with a raised prong. Size is 9/16 wide by 7/8 long by .014 thick. Location and fastening consist of inserting L-shaped stud through panel and slipping on Speed Clip. Clip is then pressed flat and the prong positioned under the stud offset.

For additional information circle No. 98 on Reader Service Card.

USEFUL LITERATURE

For additional information on the products appearing on this and the following pages, mark the key number of the item on the card bound into this issue. Drop card in the mail—no postage is required.

144 DRY IMPREGNATED LUBRICANT:

A process which produces dry film of lubricant impregnated in the surface of a metal product is described in literature offered by the Pyrene Mfg. Co., Metal Finishing Div.

145 PURIFIER FOR PLATING SOLUTIONS:

Complete information on types, sizes and models of pressure filters for electroplating, electroforming, nickel dip and neutralizer solutions is contained in a catalog published by the Industrial Filter & Pump Mfg. Co.

146 SWISS EQUIPMENT FOR BURNISHING:

Details and specifications of machinery developed to implement the Hauser burnishing method are given in a bulletin issued by the Hauser Machine Tool Co., agents for Henri Hauser, Ltd., of Switzerland.

147 BENCH MODEL TUMBLING BARRELS:

Information on bench model tumbling barrels for small and sample lot tumbling is offered by the Henderson Bros. Co. The company also makes full-size horizontal and custom-made tumbling barrels.

148 CARBIDE TIPPED AND HIGH SPEED CENTERS:

Prices, sizes, dimensions, high speed steel point sizes and insert diameter of the "Red-E" line of carbide tipped and high speed steel centers are included in a bulletin available from the Ready Tool Co.

149 SPRAY GUN HOLDS PAINT IN SUSPENSION:

Metallic paint is prevented from settling out in a spray gun built by the Gray Co., Inc. The gun, which prevents settling of hammer-type or other metallic paint by constant circulation, is described and illustrated in literature offered by the company.

150 INCREASE LIFE OF HYDRAULIC FLUIDS:

A hydraulic oil purifier which is said to maintain oil in its original condition for indefinite periods under severe conditions is described in literature available from the Honan-Crane Corp.

151 TUNGSTEN CARBIDE BURNISHING BALLS:

Burnishing balls made of tungsten carbide are being manufactured by Industrial Tectonics, Inc. Close control and very fine surface finishes are claimed for the product.

152 INSURING PAINT ADHESION:

"How Job Paint Shop Insures Good Paint Adhesion" is the title of an article in the January-February, 1951, issue of the Oakite News Service. The article describes surface preparation methods.

153 FASTER PAINT STRIPPING:

Samples of an additive for paint stripping solutions that is said to cut stripping time in half will be sent to qualified users by Klem Chemicals, Inc. The resultant solution will strip paint or baked enamel.

154 AUTOMATIC METAL PARTS WASHER:

Information on an automatic parts washer is available from G. S. Blakeslee & Co. The washer is operated by one man and will clean parts at production rates.

155 ONE-COAT PAINT HIDES DEFECTS:

A one-coat paint that will hide defects and give a hammered finish appearance is described in literature offered by the Sherwin-Williams Co. The finish can be applied without special equipment and will air-dry in ten minutes.

156 SMALL VAPOR DEGREASER:

A recovery still that can also be used as a small vapor degreaser is described in literature available from the Phillips Mfg. Co. Also available is a booklet called "Vapor Degreasing Questions and Answers."

157 MANUAL ON ALUMINUM CASTINGS:

An 80-page manual on the design, production and uses of aluminum castings has been published by Aluminum Industries, Inc. The book covers aluminum sand, permanent mold and die castings, and includes a set of casting alloy tables.

158 CORROSION-RESISTANT BLACK FINISH:

A corrosion-resistant black finish that can be applied to metals in one bath is described in a bulletin offered by E. F. Houghton & Co. The finish is said not to alter the dimensions of close-tolerance parts.

159 INFORMATION ON MAGNESIUM:

Basic information on magnesium, a list of its advantages and pictures of typical products are included in "Magnesium, Our Lightest Structural Metal," a six-page folder available from the Magnesium Association.

160 BUFFING AND POLISHING COMPOSITIONS:

Charts showing compositions to use on all types of materials, composition tests, characteristics of various kinds and grades of compositions and other data are contained in a catalog available from Lasalco, Inc.

News about UNICHROME Trade Mark

COATINGS for METALS

A black dip for zinc that's glossy and uniform

Make use of your plating equipment to get a metallic finish that looks as good as black enamel. This new Unichrome Dip for zinc plate has good gloss, uniformly dense blackness; and increases the corrosion resistance of the zinc.

Extra corrosion resistance for "raw" zinc die castings

Defense order specifications on chromate treating are easily and economically met with Unichrome Dips. Producing an iridescent yellow or olive drab finish, they provide excellent corrosion protection and dense, uniform color. The processes are fast, easily controlled.

Electrolytically-produced conversion coating speeds parts for defense

Like anodizing, the Anozinc* process for zinc plate uses current to form a tougher and more corrosion resistant finish. It dovetails with the zinc plating set-up, permitting fast, continuous processing of such parts as shell casings, die castings and propeller blades.

*Trade Mark

Unbeatable primer for aluminum and magnesium

In test after test made by outside concerns, Unichrome Primer AP-10 has come through as the one which affords greatest protection to light metals and increases durability of top coats. It adheres through weathering, salt and fresh water immersion without blistering, undercutting or cracking, and is highly recommended by well known producers of aluminum and magnesium for use prior to painting or enameling.

What to do today for a BRIGHT FINISH

A little zinc goes a long way in bright finishing

A bright finish that looks like chromium is easily obtained by zinc-plating die castings and then processing them in Unichrome Clear Dip. You don't need much of a zinc deposit either. A supply-stretching .0003" of plate is ample. Thus, pound for pound, you can plate *more* products than with other finishes, and save money besides.

The Unichrome Dip Finish resists corrosion, stays bright. It has been used for several years on ice skates, bicycle parts, and refrigerator shelves. A still higher quality finish will be assured by applying a clear protective coating such as Unichrome Coating B-115 over the Clear Dip Finish for extra protection.

A chemical treatment, the Unichrome Dip Process produces its finish integral with the zinc in 5 to 20 seconds. The solution is easily controlled and adapted for a long use in manual or automatic equipment.

HOW TO CONTINUE CHROMIUM PLATING OF ZINC DIE CASTINGS

If you can't use copper and nickel, you can plate chromium directly on zinc die castings. When plated directly on zinc die castings, the chromium is usually gray and dull, but brightness can be brought up by buffing. You'll find direct chromium plating a practical operation on simple, easy-to-buff shapes—especially with Unichrome S.R.H.S. Chromium Solution which plates brighter on castings than ordinary chromium baths.

A deposit thicker than usual is required to avoid buffing through to the base metal. And baking on of Unichrome Coating B-115 is highly recommended for extra protection against dulling in service.

UNICHROME Trade Mark

UNITED CHROMIUM, INCORPORATED

100 East 42nd St., New York 17, N. Y.
Detroit 20, Mich. • Waterbury 20, Conn.
Chicago 4, Ill. • Los Angeles 13, Calif.
In Canada:
United Chromium Limited, Toronto, Ont.

STATISTICAL QUALITY CONTROL COURSE

The college of engineering of the University of Colorado will conduct a training course in statistical quality control for ten days beginning June 19. The course will include acceptance sampling and other statistical methods used in industry. Application forms and further information can be obtained from John F. Wagner, College of Engineering, University of Colorado, Boulder, Colorado.

H. W. MARX JOINS H-VW-M

Herbert W. Marx has joined the sales force of the Hanson-Van Winkle-Munning Co., Matawan, N. J., according to an announcement by the company.

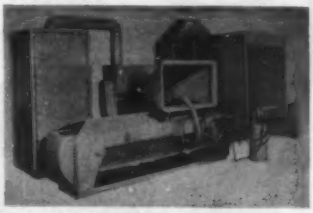
FLOCK FINISHING

(Continued from Page 42)

larities, the general tendency is to emphasize a defect. For this reason, parts should be free of surface defects. This can be accomplished with belt grinding, tumbling or abrasive blasting. After the surface is smoothed, the parts should be thoroughly cleaned to remove all grease, oil and dirt. Some form of surface conditioner, such as a chromate dip treatment, must then be used to prevent oxidation of the adhesive by the base metal

Adhesive Application. The adhesive may be applied by brush, dip or spray. If only part of the object is to be flock coated, it should be possible to mask off the remainder, and remove the mask after the flock has been applied. The emphasis should be on obtaining a smooth, even, thin coat of adhesive. Sharp corners are better avoided in the design of a die casting which is to be flock coated. The adhesive tends to stretch thin over sharp corners and surface breaks, resulting in an unsatisfactory coating.

Brush application is slower than the other methods, and is used only when production does not warrant the expense of dipping or spraying equipment, or where these methods will not give adequate coating. Brushing must be done with care, in order to have an even, thin coat of adhesive; and it will also be necessary to prevent brush marks.



AUTOMATIC EQUIPMENT has been developed for the application of flock coatings. The equipment above has a booth for adhesive application (by spray gun), a booth for spray flock application and a moving conveyor connecting the two. Photo courtesy of Paasche Airbrush Co.

The dip method, when practical, is the simplest and most economical form of application.

(Continued on Page 61)

it's the SHAPE that counts!

Butts, hinges and other builders' hardware essential to housing and the nation's defense program, are burnished smooth by Abbott Cones . . . shaped for better burnishing of flat surfaces joined to curved or cylindrical sections. Abbott Burnishing Shapes — Ball, Ovalball, Cone, Diagonal, Pin — make effective contact on metal stampings or castings of any size and shape. Each is a burnishing tool made from Abbott's high quality bearing ball steel, deep hardened and polished to a mirrorlike, glass hard finish. For *quality* barrel burnishing . . . use Abbott.

WRITE for Abbott Catalog-Manual of sizes, shapes and barrel burnishing practice.

ABBOTT

THE ABBOTT BALL COMPANY
1084 New Britain Ave.
Hartford 10, Conn., U.S.A.

Circle No. 12 on Reader Service Card

1 2 3 4 5

How to cut corners, cut costs, hold quality

OAKITE metal-cleaning procedures can make an entire production operation easier, cheaper, quicker. Here are two examples:

1. Pre-Paint Treatment Saves $800 Monthly That's what an electrical manufacturer credits to the OAKITE CrysCoat PROCESS, which simultaneously cleans and phosphates metal surfaces.

2. New Brass Cleaner Makes Big Savings A large electroplating job shop cleans brass with a new Oakite formula that minimizes tarnishing and rejects; cleans so well that, in many cases, a copper strike is dropped from the plating cycle.

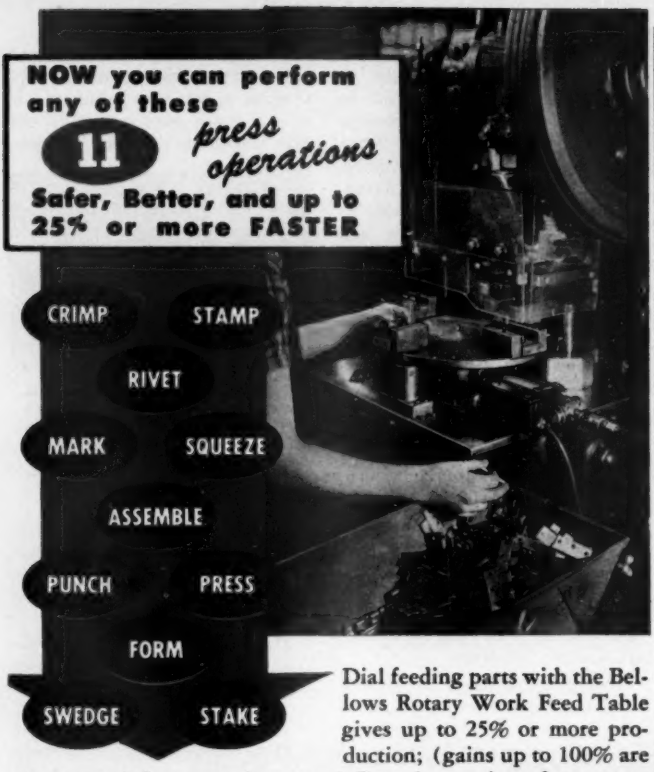
FREE Write Oakite Products, Inc., 34G Thames St., New York 6, N. Y., for the new 44-page booklet *"Some good things to know about Metal Cleaning"*. Subjects:

Machine cleaning	**Tank cleaning**	**Electrocleaning**
Pre-paint treatment	**Pickling**	**Paint stripping**
Steam-gun cleaning	**Burnishing**	**Rust prevention**

Technical Service Representatives in Principal Cities of U. S. & Canada

OAKITE SPECIALIZED INDUSTRIAL CLEANING MATERIALS • METHODS • SERVICE

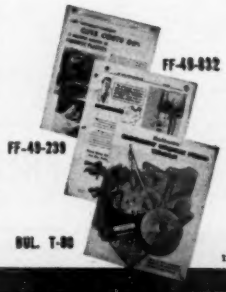
Circle No. 20 on Reader Service Card



Dial feeding parts with the Bellows Rotary Work Feed Table gives up to 25% or more production; (gains up to 100% are not unusual from users' reports.) Even inexperienced operators get this added production because *safe* dial feeding takes away the fear that unconsciously causes an operator to slow up.

With the air-powered Bellows Rotary Feed Table on the job, the operator loads at one station, unloads at another, while work goes on at a third station. (Standard tables will position 4, 6, 8, 12 or 24 stations.) Table and ram are electrically or mechanically synchronized. The Rotary Feed Table sets the production pace, and maintains it uniformly all day long. The operator rhythmically loads and unloads. Production soars.

For full details how you can apply safe, "Controlled-Air-Power" feeding of parts to press rams to obtain up to 25% or more greater production, write for your free copy of Bulletin T-80, and the dial feeding Foto Facts File (installation photographs, wiring diagrams, etc.). Address: The Bellows Co., Department DC-451, Akron, 9, Ohio.



The Bellows Co.
AKRON 9, OHIO
FASTER SAFER BETTER PRODUCTION — WITH CONTROLLED-AIR-POWER

Circle No. 17 on Reader Service Card for more information

SEVERAL FINISHES

(Continued from Page 45)

The part is dipped and then removed to let the excess adhesive run off. A slow-setting adhesive of different small parts, most of these finishing operations are manual rather than automatic.

Indicative of the care with which the finishing is done are the many inspections to which these surfaces are subjected. Gloved operators seated at long tables brightly illuminated by rows of fluorescent lights, scrutinize the plating for minute flaws several times during the course of successive plating operations.

A number of finishing cycles are used for plating die cast parts, depending upon the base metal, size and shape of the part, metal to be deposited and the quantity of units in the production run.

It would be impossible here to detail and describe these finishing operations.

ACROMARK
MEANS "ACCURATE MARKING"

ENAMEL FILL YOUR DIE-CAST PARTS with
THE ACROPRINTER
Reg. U. S. Pat. Off.
Write For Latest Literature

Hand and Motor Driven Models
The ACROMARK Company
436 Morrell St., Elizabeth 4, N. J.
"The Original Marking Specialists"

Circle No. 13 on Reader Service Card.

INDUSTRY NEWS

GETS SALES POST AT ADVANCE PRESSURE

Alfred Schneier, Jr., has been named assistant sales manager of Advance Pressure Castings, Inc., according to a recent company announcement.

Mr. Schneier, who is a veteran of World War II, joined the Army immediately upon graduation from high school. He served with the 78th Division in Europe until wounded. After his release from the Army, he resumed his education at Pratt Institute, at the same time gaining shop experience with shop work at Advance Pressure.

Alfred Schneier, Jr.

After he had gained experience in all phases of the company's activities, he was transferred to the sales engineering department. The company, which is located in Brooklyn, N. Y., manufactures zinc and aluminum die castings.

CAMPBELL JOINS ECLIPSE FUEL

Donald A. Campbell has joined the Eclipse Fuel Engineering Co., Rockford, Ill., as vice president in charge of engineering and research, according to an announcement by J. H. Sands, executive vice president.

Mr. Campbell, a graduate of the University of Colorado's Engineering School, was with the company from 1929 to 1939 as a gas combustion engineer. More recently he was manager of the industrial division of Affiliated Gas Equipment, Inc.

DIE CASTING MANAGER GETS ALCOA SALES POST

Lewis P. Favorite has been named manager of Aluminum Company of America's New York district sales office, succeeding Edward B. Wilber, who has been elected president of the American Lumber & Treating Co., Chicago.

Mr. Favorite, who joined Alcoa in 1927, after graduating from the University of Michigan, was formerly product manager in charge of die castings sales for the company.

Alcoa also announced that Robert L. Williamson has been named to replace Mr. Favorite as product manager in charge of the sale of die castings. Mr. Williamson has been manager of the company's Kansas City district sales office since 1945.

NEW PAINT LABORATORY

The National Bureau of Standards, Washington, D. C., has constructed a new paint weathering laboratory. In the past, the durability tests of paints by various laboratories have shown widely varying results. By controlling the variables, and by using accelerated weathering (exposure to regular cycles of artificial sunlight, heat and water to hasten deterioration) the Bureau expects to achieve uniform operation at all times.

The room, 16 by 25 feet in size, is maintained within ± 1 C of any desired working temperature, which is, at present, 27 C. The relative humidity is not controlled directly, but remains in the range of 40 to 60 per cent as a result of the subcooling of fresh air brought into the room.

AUTO-LITE ELECTS FIVE

Election of five vice presidents by the board of directors of the Electric Auto-Lite Co. has been announced by Royce G. Martin, president and board chairman. James B. Fenner, formerly treasurer of the company, was elected vice president and comptroller.

Also elected were H. E. Hasemeyer, R. M. Lake, C. L. Lancaster and Lyman A. Wine. Mr. Lake previously was connected with part of the company's die casting activities, as assistant to C. L. Patterson, vice president in charge of the Lockland, Ohio, plant.

NEW COMPANY WILL MAKE INDUSTRIAL PISTON RINGS

Formation of Precision Piston Rings of Indianapolis has been announced by George J. Deeb, Jr. The company, which will make steel piston rings for die casting machines and other industrial and aviation uses, will have offices at 1308 North Capitol Ave., Indianapolis 2, Ind.

NEW REYNOLDS ALUMINUM PLANT

A new aluminum reduction plant with an annual production capacity of 150,000,000 pounds

of aluminum pig will be constructed near Corpus Christi, Texas, by the Reynolds Metals Co., Richmond, Va., according to R. S. Reynolds, Jr., president of the company. The plant, scheduled for operation by the end of 1951, will employ about 600 people.

KIOWA SELECTS AGENCY

The Kiowa Corp., Marshalltown, Iowa, has selected Kane Advertising, of Bloomington, Ill., to handle the company's first national advertising campaign, according to Ralph C. McCague, president.

M. I. T. HAS CORROSION COURSE

A one-week course on the characteristics and mechanisms of corrosion and corrosion control will be offered at the Massachusetts Institute of Technology beginning on June 18. According to Professor W. H. Gale, director of the summer session, the purpose of the course will be to bring new information on corrosion control to men in industry.

On the schedule are discussions of the design of equipment, chemical treatment of the environment, cathodic protection and selection of coatings and alloys economically feasible for reducing corrosion losses. A knowledge of first-year college chemistry will be essential for those taking the course.

BRIGHT BRASS

(Continued from Page 31)

jected to humidity, abrasion, perspiration and sulfur reaction.

From a mechanical design viewpoint, as well as from appearance, the die cast fittings have been well suited to efficient production. The name plate die castings used as part of the exterior trim come from the die caster ready to be applied to the sheet metal refrigerator door.

Small studs formed on the rear of the name plate fit through holes pierced in the steel door and are held in place with Speed Nuts requiring no thread cutting or other preparatory operations.

To assemble the die cast handle on the freezing compartment door, self tapping screws are used. The door is constructed of two molded styrene halves. The handle is attached to one half of the door by means of self tapping screws and then the two halves are cemented together so that the screws are completely hidden and the assembly is permanently sealed.

Other die cast components in the unit are the small T-shaped elements which serve as shelf supports. These pieces, likewise, need no machining or other secondary operations, but are ready to insert into the refrigerator.

In all cases, the shape and color specified by the designers as being most appealing and salable have been readily obtained through the use of die cast parts.

Here's The Point

Lester Castings, Inc. is as dependable as a safety pin. It's something you take for granted. When you place your die casting production in the hands of Lester Castings, you can be sure that from beginning to end—from engineering and tooling through the final production of high quality parts—the job will meet the most RIGID specifications. Write or call us today—we'll be happy to quote at no obligation.

LINC. **LESTER CASTINGS, INC.**
3170 WEST 33rd ST., CLEVELAND, OHIO

Lives depend on QUALITY!

This precision die casting houses the CO_2 cartridge for inflation of "Mae West" life preservers.

DIE CASTING by YODER

Quality, the result of skill and years of experience, is instilled in every Yoder die casting. You can depend on quality when you depend on Yoder. Call, wire, or write today!

Centrally located to industrial producers

Yoder
DIE CASTING, INC.
728 Kiser Street • Dayton 4, Ohio

The mating female thread in the housing is cut with a collapsible tap in a drill press at the rate of two per minute.

Preventing Light Leakage

The three aluminum die castings which mount and house the lamp, are cast for a close fit to prevent leakage of light. These parts are die cast in aluminum because of its superior heat transmission properties. All parts of this assembly are attached by means of holes either drilled or cored. Cooling vents in the cap and an aperture for the electric cord are formed by coring.

Summary

Elwood Pattern Works, Inc., is a recognized leader in the field, supplying both professional and amateur equipment for photographers. Many of this company's products are manufactured in large quantities, justifying the expenditure for die casting dies. Company procedure calls for changeover to die castings wherever the shift can be accomplished with economical unit cost.

HYDRAULIC FITTINGS

(Continued from Page 28)

tions are required.

The small trigger for the service jack is located in a cored slot in the jack handle cross bar and is, itself, a die casting. Instead of zinc, aluminum has been used for the trigger, although either metal might have been equally suitable for this application.

A number of parts in the handle assembly Figure 3 are, in fact, die cast. These include the hand grip which contains the lock and is mounted at the top of the handle. The hand grip carries out the decorative plan of the designer, and yet serves an important functional job. Vertical ridges which enhance the appearance of the handle, also provide non-slipping finger grips.

Of course, the lock barrel itself is die cast in zinc, and so is the small driver which is a safety device to engage or disengage the handle. This prevents anyone from lowering the jack while the mechanic is beneath the car.

Decorative Trim

Four of the five die cast parts used on the bumper jack are external parts (including the valve housing already mentioned). These are designed for streamlined appearance as well as functional use, and the result is a handsome, salable piece of equipment.

One additional part on the service jack likewise makes its contribution to the good looks of the unit. That is the base cover which covers the power unit and houses the jack lamp. An angular core pull makes possible the aperture for the lamp without extra machining.

One small, simple and interesting die casting is a tube-like plunger disc used on the bumper jack. This part appears to be suitable if cut from tube stock, but the non-standard diameters makes it more economical as a die casting. It has been possible to incorporate the cavity for

UNIVERSAL
Die Castings
Preferred WHEN ONLY
THE BEST IS GOOD ENOUGH
There must be a reason why so many highly discriminating manufacturers entrust all of their work to us. The reason is they know from experience that the finished job will meet every specification as to appearance, strength, accuracy and function. Furthermore, the price on either long or short runs is in line with their production and selling costs.
If you are located west of the Mississippi River we are in an excellent position to take care of your die casting requirements. Quotations made promptly.
UNIVERSAL
DIE CASTING COMPANY
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this piece in a combination die, thus minimizing tool costs.

Altogether, Blackhawk Manufacturing Company uses a large number of die cast parts. While cost is a primary advantage, each application of die castings is based upon sound engineering principles and strength calculations. After many years of successful use of zinc and aluminum die castings, Blackhawk is continuing to expand its application of this efficient quantity production method.

MAGNESIUM PLANT REOPENED

A magnesium plant, constructed originally for defense production in 1941, will be rehabilitated under a government contract by the H. K. Ferguson Co., it was announced recently. Production at the plant, which has been idle since 1945, will be under the control of the Diamond Magnesium Corp., a subsidiary of the Diamond Alkali Corp.

The project is to be completed and the plant put into operation during April. During the next two years the plant will produce an estimated 72,000,000 pounds of magnesium by the electrolytic process.

Among a wide variety of precision die castings by FEDERAL are power drill components such as the above. For over 3 decades our highly trained experts have solved problems of even more intricate designs for many of America's best known manufacturers.

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LAPPING MACHINES

(Continued from Page 54)

cle. Conditioning rings freely rotate in their own orbit on the lapping plate, their motion being generated by the action of the plate itself.

Parts to be lapped are placed inside the conditioning rings, and are separated by thin micarta or masonite workholders in which holes are cut to the profile of the parts to be lapped. These parts are rotated by the conditioning rings—thus there is no regular cutting pattern on the lapped surfaces.

The conditioning rings serve the purpose of maintaining flatness of the lap plate. They accomplish this by actually lapping the plate faster than it is being worn by the parts being lapped. They can be adjusted radially inward or outward, as necessary, to maintain absolute flatness at all times. It is this feature which eliminates "downtime," and makes the Lapmaster a continually productive tool.

The actual lapping of surfaces results from the action of lapping compound which is fed to the lap plate by a feed track leading from a compound agitator tank to the side of one of the conditioning rings. Rotation of the rings distributes the compound over the surface of the lap plate in just the proper amount necessary for lapping. Spent compound and metal particles are carried away by centrifugal force and gravity through serrations in the lap plate, so that fresh compound is constantly being brought into contact with the surfaces being lapped. The orifice through which the compound is delivered to the feed track is also controlled by the timing clock, and automatically cuts off at the end of the cycle.

While the Lapmaster will handle almost all materials, both hard and soft, metallic and non-metallic, its application to die castings revolves around its ability to lap the most common die cast metals such as aluminum, zinc and magnesium. The time cycle required to lap these materials depends on several factors, such as flatness and finish desired, previous machining operations and type of lapping compound used. Yet it is important to note that *seldom will it take more than five minutes to completely remove milling cutter marks or other prior machine tool roughness or out of flat conditions — in other words to generate surfaces which will make the use of gaskets unnecessary.*

Mention of lapping compound has been made in several places, and this should be enlarged upon—because type of compound is the deciding factor in final RMS surface finish and speed of stock removal. Lapmaster lapping compounds are composed of either fine or coarse grain abrasives and a specially developed carrying vehicle.

Fine grain abrasives generate a low RMS finish, while coarser sizes cut faster but produce rougher surfaces. Aluminum oxide abrasives are used for most lapping operations on flat surfaces, particularly when fine finishes are desired. Silicon carbide abrasives cut faster and result in rougher finishes than aluminum oxide abrasives, even when size of grain is the same.

Aluminum oxide abrasives are called for when die castings of soft materials such as aluminum are encountered, and can be depended upon to produce finishes of as low as 1 to 2 RMS in short lapping cycles.

Irregular Shapes Lapped

Ability of this type of lapping machine to handle a wide range of die cast shapes results from two factors: the fact that heavy pressure is not required on the lapped parts, and that there is no overhead lapping plate to limit height of the parts.

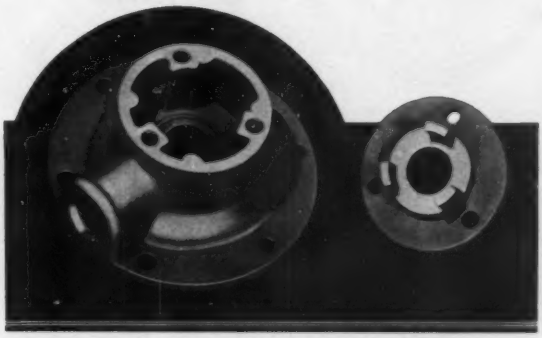
In the standard Lapmaster, considerable clearance is allowed between the lap plate and the spider bar which controls adjustment of the conditioning rings. Even this overhead arrangement can be eliminated when unusually tall parts must be lapped by using a standard roller bar method of adjusting the rings.

The two ring-adjusting methods are illustrated in Figure 3. Both devices are standard and are interchangeable, and the manufacturer recommends the one most effective on a given type of work. It is interesting to note that a large number of parts could be lapped in a single cycle, and that no two of them would necessarily have to be the same height, the same shape, or even the same material.

Production Quantities Vary

Production can mean one thing to one user or manufac-

PROFITS



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turer of die castings, and it can mean an altogether different figure to another. To one man, it might mean several hundred parts a day—to another, several thousand or hundreds of thousands. A small 12" diameter lapping plate machine might handle all the production required for a manufacturer of pumps, while a carburetor manufacturer might need the capacity of a 36" or a 48" machine. Several automotive manufacturers, for example, use a battery of 72" machines, while a relatively large valve manufacturer satisfied his production requirements with a single 24" machine.

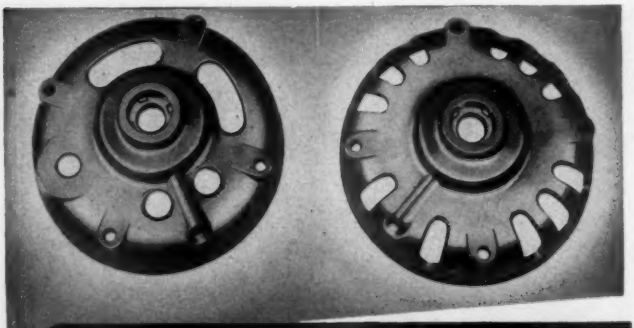
Figure 1 shows a partial capacity chart covering several of the standard Lapmaster models, having plate diameters of 12", 24", and 48" respectively. Since the average die casting is less than 6" in length (or diameter), these three machines would handle most lapping requirements met in the die casting field.

The chart shows that it does not necessarily follow that the largest machine should always be used for the largest part. Production requirements are frequently the determining factor. For example, take a part 1" in diameter, and a part 3" in diameter. In a single cycle, the 12" machine could lap 33 of the 1" parts or three of the 3" parts; the 24" machine could handle 180 of the 1" parts or 16 of the 3"; and the 48" Lapmaster could produce 764 of the 1" parts or 88 of the 3" ones. Each of these cycles is seldom more than a few minutes for a soft metal die casting. In some cases it is only a minute or two. Thus, even the smallest 12" machine could produce a tremendous daily output of relatively small parts.

Comparison with Grinding-Gasketing

Once it is clear that this new method of lapping can produce surfaces of sufficient flatness and finish so that gaskets can be eliminated, it remains only to study the cost differential between the standard method of grinding and gasketing versus the new idea of lapping to avoid the necessity of using gaskets. A picture of the steps involved in each procedure speaks for itself:

First, in the case of grinding and gasketing, a costly fixture must be designed to hold the die casting rigidly in the grinder. Rigid holding is very necessary in grinding operations. Such fixtures frequently run well over $1000 because of the unusual shapes of die castings and their non-magnetic nature which requires mechanical methods of holding. The cost of gasketing is hard to evaluate, and is best interpreted from experience. It is sufficient to point out that time involved in assembling gaskets to cover the intricate lands of some hydraulic transmission parts is not only costly, but the operation is frequently almost impossible.



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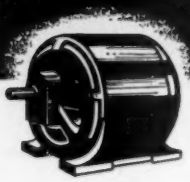

THE matter of cost was of paramount importance on this particular high production job. We were able to produce castings which answered every requirement of close tolerance, strength and uniformity at a price considerably under that of stamped or sand cast end bells.

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When lapping is employed to generate surfaces which will seal without gaskets, the gasketing time and cost of the gasket is obviously eliminated. A very significant saving is frequently found in the holding devices, too. In most cases die cast parts lap of their own weight and a simple micarta workholder, costing a matter of a few dollars, will do the job. In some cases holding devices must be developed, but these seldom run as high as $100.

Another saving enjoyed by the production man who laps his pressure-holding die castings was hinted earlier — and that is in the labor cost. Precision grinding is a machine operation, it is true, but skill and experience are required — with consequent high rates of pay. The Lapmaster operation is automatically timed and can be handled by an inexperienced operator after a short period of explanation. As a matter of fact, a number of users depend completely on women operators, many of whom never before handled a machine tool.

4. UNUSUAL SHAPES can be lapped using a roller bar attachment to allow overhead clearance. Shown above are some large, irregular-shaped automotive sand castings in a 72" machine.

One objection frequently voiced against lapped metal-to-metal joints is "they can't be taken apart." Lapped surfaces actually are easier to separate than gasketed surfaces—because the gaskets tend to stick. Incidentally, it is not necessary to re-lap when re-assembling if reasonable care is taken and

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the surfaces are not damaged.

The idea of lapping is not new to the die casting field. A number of manufacturers have been lapping certain parts for years on limited capacity lapping machines or by means of skilled hand labor. But production precision lapping to eliminate gaskets on all pressure holding die castings—at a cost frequently lower than grinding—is a startling advancement, and merits the careful investigation of every forward thinking production man. The manufacturers of the Lapmaster have set up a complete testing and development laboratory to investigate new applications of this method of lapping, and its facilities are available to any manufacturer who wants to determine whether or not lapping can improve his product or cut his costs. He can arrange to have representative die castings lapped, and time cycles and production capacity will be determined for him.

ENLARGER

(Continued from Page 22)

large die cast main body shown in Figure 1.

The casting consists of two hollow-cored parallel elements connected by a T-shaped web. This web with a T-section has adequate strength and rigidity to support the entire lamp assembly on an axis parallel to the adjustment post.

The casting is clamped onto the post by means of the split sleeve. A double cam on one of two ears formed on the split sleeve serves to clamp the two sides together when a hand wheel with a cammed inner face is turned. This provides a simple, rapid and positive means of locking the enlarger unit to the adjustment post.

The body is cast with a slot at the front end to accommodate the film holder. Formed integral with this piece are two guides, one on each side, to pilot the film holder into place and act as retainers.

Also integral with the die cast

body are two small bosses on each side to hold flat springs used to apply pressure to keep the film flat. The springs are slipped between the two bosses on each side; a cored hole below them serves for attachment of a shaft to which the stamped metal lifting-fingers are fastened. (These lifting-fingers raise the film carrier to permit adjustment of the negative.)

Two additional die castings are mounted onto the lower end of the main casting to provide adjustable, focusing support for the lens. The mounting die casting is produced with flanges having cored holes by which it is fastened to the main casting. This piece is tapped and composes the female portion for the adjusting barrel.

The adjusting barrel is also a die cast piece and has a triple thread. A feature of the machining operation on this unit is the use of geometric die on a drill press, whereas usually this type of threading would be done on a turret lathe or screw machine. The drill press setup permits even a fairly inexperienced worker to do this job.

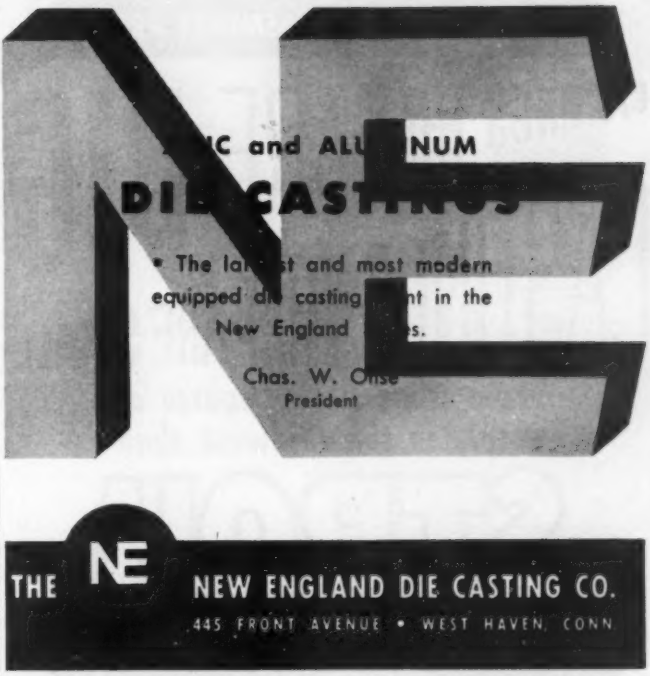
FLOCK FINISHING

(Continued from Page 51)

sive must be used with a dip tank, so that the film will not harden while the excess runs off. In dipping die cast shapes, care must be taken that there are no recesses to trap adhesives, and that difficult-to-reach areas are adequately covered.

Spraying is the most practical form of adhesive application. Either small-cup or tank-fed guns can be used, and in the case of very high production, it is possible to use automatic equipment. The spray method allows the faster drying adhesive to be used, as the parts can be coated as they leave the spray booth.

Flock Application. On rigid parts such as die castings, flock is applied either by spray gun or by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the electrostatic method. Flock spray guns are similar in construction to paint spray guns, and are fed either from an attached container, or from a remote container through a pressure line. Recommended spraying pressure is 25-40 psi, with slightly higher pressures needed when using the more viscous adhesives. Air used in spraying flock must be kept moisture free. Automatic equipment is available for spraying flock.

The electrostatic method of flock application is similar in nature to the electrostatic paint spray method. It is a patented process which is used under license.

What Difficulties Are There?

Other than keeping the adhesive wet until the flock can be sprayed on, the difficulties are mostly involved in the storage and handling of the flock. Moisture is the primary cause of trouble. If flock is exposed to dampness, it will form into lit-

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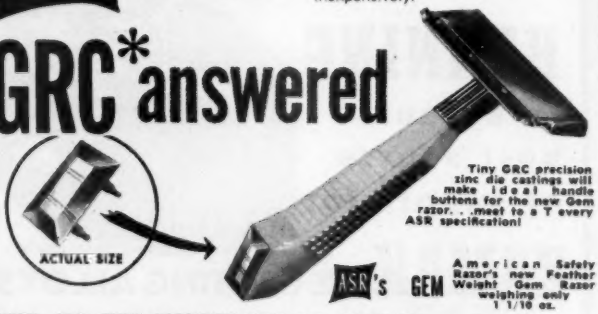

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tle balls or pills; therefore, it should be stored in a cool, dry room until needed. Flock comes from the manufacturer in weatherproof bags, and some users store these bags until needed; others prefer spreading it on trays in a room kept moisture-free with calcium chloride or some other hygroscopic chemical. As mentioned before, air used to spray flock must be kept free of moisture.

In the event that flock does become damp, it can be dried either with chemicals or by the use of spreading trays and heat lamps. After the moisture has been removed, there will be an electrostatic attraction between the flock particles. This can be overcome by allowing the normal moisture regain to take place in atmospheric conditions. After the flock has been dried, it should be screened to break up any lumps and to remove foreign matter. This will also apply in processing flock recovered from the spraying operation.

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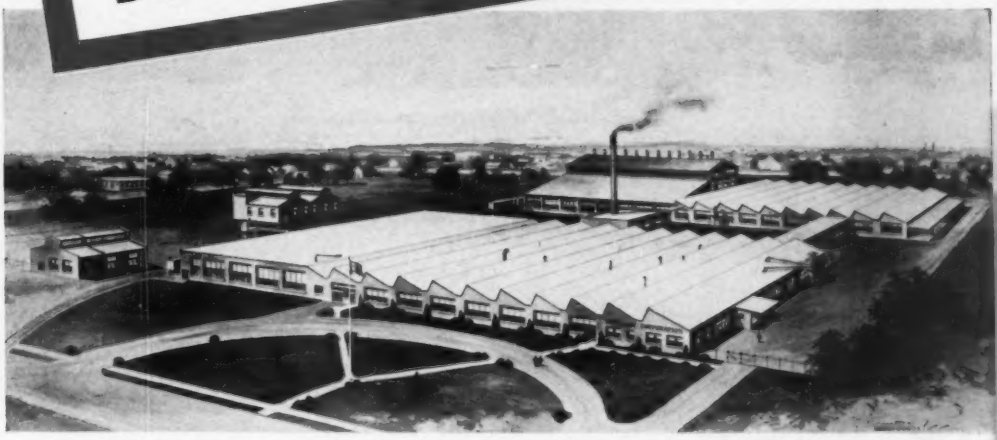

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